DOCUMENT RESUME

ED 067 150 PS 005 780

AUTHOR	Van De Riet, Vernon; Resnick, Michael B.
TITLE	A Sequential Approach to Early Childhood and Elementary Education, Phase III.
INSTITUTION	Florida Univ., Gainesville. Coll. of Health Related Professions.
SPONS AGENCY	Office of Child Development (DHEW), Washington, D.C.
REPORT NO	OCD-H8222-BHO
PUB DATE	Jan 72
NOTE	225p.
EDRS PRICE	MF-$0.65 HC-$9.87
DESCRIPTORS	*Cognitive Development; Comparative Analysis; Culturally Disadvantaged; Curriculum Development; Demonstration Programs; Disadvantaged Youth; *Early Childhood Education; Elementary Education; *Intervention; Learning Readiness; *Preschool Programs; *Sequential Approach; Statistical Data; Technical Reports
IDENTIFIERS	Learning to Learn Program

ABSTRACT

The effects of two or three years of a sequential educational intervention program on culturally deprived children were studied with two groups of four-year-olds and two groups of five-year-olds. They were matched on several developmental variables, with one group at each age level entering the experimental Learning to Learn Program. The other groups served as controls and the four-year-olds entered day care centers while the five-year-olds attended traditionally run kindergartens. Comparison on several developmental measures between the experimental and control groups made after each year of the program indicate that the children in the Learning to Learn Program made much larger developmental gains than their matched control groups. The project supports the contention that early intervention programs with culturally deprived children can rectify their educational deficits. (Author/LH)

ED 067150

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Grant Report

For Office of Child Development Grant No. OCD H8222 B/H/O

Submitted to the Department of Health, Education and Welfare

Office of Child Development

Project Title: A Sequential Approach to Early Childhood and Elementary Education, Phase III

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January, 1972

PS 005780

Table of Contents

Introduction .....1 - 2
Objectives .....2 - 3
The Theoretical Basis of the Program .....3 - 7
Design of Project.....8 - 9
Objectives and Hypotheses of the Evaluation Program.....9
Specific Hypotheses.....9
Instruments 10
Population and Sample.....11-13
Procedures.....13-18
Results.....19-136
- Intelligence.....19-52
- Achievement.....53-66
- Reading Ability.....67-75
- Language.....76-95
- Mathematics.....96-109
- School Data.....110-117
- Perceptual Motor.....118-123
- Personality.....124-125
- Descriptive Data.....126-128
- Longitudinal Intellectual Developmental Patterns.....129-136

Discussion.....137-141
Conclusions.....142-146
Implications.....147
Summary.....148
References.....149-151
Appendix.....A1-A60

List of Tables

		Page
Table 1	Pre-Program Means, S.D.'s and t's for the Learning to Learn Experimental Group (E_4) and their Controls (C_4) on the Stanford Binet and Seguin	12
Table 2	Pre-Program Means, S.D.'s and t's for the Learning to Learn Experimental Group (E_5) and their Controls (C_5) on the Stanford Binet, ITPA, SRST, and Seguin	13
Table 3	A Pre-Learning to Learn Program Comparison between the Experimental (E_5) and Control (C_5) Groups on the Stanford Binet	19
Table 4	A Post Kindergarten Comparison between the Experimental (E_5) and Control (C_5) Groups on the Stanford Binet	19
Table 5	A Post First Grade Comparison between the Experimental (E_5) and Control (C_5) Groups on the Stanford Binet	20
Table 6	A Post Second Grade Comparison between the Experimental (E_5) and Control (C_5) Groups on the Stanford Binet	20
Talbe 7	A Pre Learning to Learn Program to Post Second Grade Longitudinal Comparison between the Experimental (E_5) and Control (C_5) Groups on the Stanford Binet	21
Table 8	A Yearly Longitudinal Pre Learning to Learn Program to Post Second Grade Comparison between the Experimental (E_5) and Control (C_5) Groups on the Stanford Binet	22
Table 9	A Pre Learning to Learn Program Comparison between the Experimental (E_5) and Control (C_5) Groups on Stanford Binet Mental Age	24
Table 10	A Pre Learning to Learn Program to Post Kindergarten Comparison between the Experimental (E_5) and Control (C_5) Groups on Stanford Binet Mental Age	25
Table 11	A Post Kindergarten to Post First Grade Comparison between the Experimental (E_5) and Control (C_5) Groups on Stanford Binet Mental Age	27
Table 12	A Post First to Post Second Grade Longitudinal Comparison between the Experimental (E_5) and Control (C_5) Groups on Stanford Binet Mental Age	28
Table 13	A Pre Learning to Learn Program to Post Second Grade Longitudinal Comparison between the Experimental (E_5) and Control (C_5) Groups on Stanford Binet Mental Age	29
Table 14	A Pre Learning to Learn Program Comparison between the Experimental (E_4) and Control (C_4) Groups on the Stanford Binet	32

		Page
Table 15	A Post Nursery School Comparison between the Experimental (E_4) and Control (C_4) Groups on the Stanford Binet	32
Table 16	A Post Kindergarten Comparison between the Experimental (E_4) and Control (C_4) Groups on the Stanford Binet	33
Table 17	A Post First Grade Comparison between the Experimental (E_4) and Control (C_4) Groups on the Stanford Binet	33
Table 18	A Pre Learning to Learn Program to Post First Grade Longitudinal Comparison between the Experimental (E_4) and Control (C_4) Groups on the Stanford Binet	34
Table 19	A Yearly Longitudinal Pre Learning to Learn Program to Post First Grade Comparison between the Experimental (E_4) and Control (C_4) Groups on the Stanford Binet	35
Table 20	A Pre Learning to Learn Program Comparison between the Experimental (E_4) and Control (C_4) Groups on Stanford Binet Mental Age	37
Table 21	A Pre Learning to Learn Program to Post Nursery Comparison between the Experimental (E_4) and Control (C_4) Groups on Stanford Binet Mental Age	38
Table 22	A Post Nursery to Post Kindergarten Comparison between the Experimental (E_4) and Control (C_4) Groups on Stanford Binet Mental Age	38
Table 23	A Post Kindergarten to Post First Grade Comparison between the Experimental (E_4) and Control (C_4) Groups on Stanford Binet Mental Age	39
Table 24	A Pre Learning to Learn Program to Post First Grade Longitudinal Comparison between the Experimental (E_4) and Control (C_4) Groups on Stanford Binet Mental Age	39
Table 25	A Comparison between the Experimental (E_4 & E_5) Groups and between the Control (C_4 & C_5) Groups at Chronological Age Five on the Stanford Binet	42
Table 26	A Post Kindergarten Comparison between the Experimental (E_4 vs E_5) Groups and between the Control (C_4 vs C_5) Groups on the Stanford Binet	43
Table 27	A Post First Grade Comparison between the Experimental (E_4 & E_5) Groups and between the Control (C_4 & C_5) Groups on the Stanford Binet	43
Table 28	A Longitudinal Comparison between the Experimental (E_4 vs E_5) Groups and between the Control (C_4 vs C_5) Groups on Stanford Binet Mental Age Gain	47

Page

Table 29 A Post Second Grade Comparison between the Experimental (E_5) and Control (C_5) Groups on the WISC Verbal Scale 49

Table 30 A Post First Grade Comparison between the Experimental (E_4) and Control (C_4) Groups on the WISC Verbal Scale 50

Table 31 A Post Kindergarten Comparison between the Experimental (E_4 & E_5) and Control (C_4 & C_5) Groups on the School Readiness Screening Test 53

Table 32 A Post Kindergarten Comparison between the Experimental (E_4 vs E_5) and Control (C_4 vs C_5) Groups on the School Readiness Screening Test 54

Table 33 A Beginning First Grade Comparison between the Experimental (E_5) and Control (C_5) Groups on the Metropolitan Readiness Test 55

Table 34 A Beginning First Grade Comparison between the Experimental (E_4) and Control (C_4) Groups on the Metropolitan Readiness Test 56

Table 35 A Beginning First Grade Comparison between the Experimental (E_4 vs E_5) and Control (C_4 vs C_5) Groups on the Metropolitan Readiness Test 57

Table 36 A Post First Grade Comparison between the Experimental (E_5) and Control (C_5) Groups on the Primary Mental Abilities I 58

Table 37 A Post Second Grade Comparison between the Experimental (E_5) and Control (C_5) Groups on the Primary Mental Abilities II 59

Table 38 A Post First Grade Comparison between the Experimental (E_4) and Control (C_4) Groups on the Primary Mental Abilities I 60

Table 39 A Post First Grade Comparison between the Experimental (E_4 vs E_5) and between the Control (C_4 vs C_5) Groups on the Primary Mental Abilities Test I 61

Table 40 A Post First Grade Comparison between the Experimental (E_5) and Control (C_5) Groups on the Stanford Achievement Test I 62

Table 41 A Post Second Grade Comparison between the Experimental (E_5) and Control (C_5) Groups on the Stanford Achievement Test II 63

Table 42 A Post First Grade Comparison between the Experimental (E_4) and Control (C_4) Groups on the Stanford Achievement Test I 64

Table 43 A Post First Grade Comparison between the Experimental (E_4 vs E_5) and between the Control (C_4 vs C_5) Groups on the Stanford Achievement Test I 66

Table 44 A Post First Grade Comparison between the Experimental (E_5) and Control (C_5) Groups on Reading Measures 68

Page

Table 45 A Post Second Grade Comparison between the Experimental (E_5) and Control (C_5) Groups on Reading Measures 71

Table 46 A Post First Grade Comparison between the Experimental (E_4) and Control (C_4) Groups on Reading Measures 74

Table 47 A Pre Learning to Learn Program Comparison between the Experimental (E_5) and Control (C_5) Groups on Two Subtests of the Illinois Test of Psycholinguistic Abilities 76

Table 48 A Post Kindergarten Comparison between the Experimental (E_5) and Control (C_5) Groups on Four Subtests of the Illinois Test of Psycholinguistic Abilities 77

Table 49 A Post First Grade Comparison between the Experimental (E_5) and Control (C_5) Groups on Four Subtests of the Illinois Test of Psycholinguistic Abilities 78

Table 50 A Post Second Grade Comparison between the Experimental (E_5) and Control (C_5) Groups on Four Subtests of the Illinois Test of Psycholinguistic Abilities 79

Table 51 A Post Nursery Comparison between the Experimental (E_4) and Control (C_4) Groups on Four Subtests of the Illinois Test of Psycholinguistic Abilities 80

Table 52 A Post Kindergarten Comparison between the Experimental (E_4) and Control (C_4) Groups on Four Subtests of the Illinois Test of Psycholinguistic Abilities 81

Table 53 A Post First Grade Comparison between the Experimental (E_4) and Control (C_4) Groups on Four Subtests of the Illinois Test of Psycholinguistic Abilities 82

Table 54 A Post Kindergarten Comparison between the Experimental (E_4 vs E_5) Groups and between the Control (C_4 vs C_5) Groups on Four Subtests of the Illinois Test of Psycholinguistic Abilities 83

Table 55 A Post First Grade Comparison between the Experimental (E_4 vs E_5) Groups and between the Control (C_4 vs C_5) Groups on Four Subtests of the Illinois Test of Psycholinguistic Abilities 84

Table 56 A Post First and Post Second Grade Comparison between the Experimental (E_5) and Control (C_5) Groups of Verbal Stories on Creativity, Abstraction, and Language Quality 86

Table 57 A Post First and Post Second Grade Comparison between the Experimental (E_5) and Control (C_5) Groups of Verbal Stories on Number of Sentences and Length of Remark 87

Page

Table 58 A Post Kindergarten and Post First Grade Comparison between Experimental (E_4) and Control (C_4) Groups of Verbal Stories on Creativity, Abstraction, and Language Quality 88

Table 59 A Post Kindergarten and Post First Grade Comparison between the Experimental (E_4) and Control (C_4) Groups of Verbal Stories on Number of Sentences and Length of Remark 90

Table 60 A Post First Grade Comparison between the Experimental (E_4 vs E_5) and between the Control (C_4 vs C_5) Groups of Verbal Stories on Creativity, Abstraction, and Language Quality 91

Table 61 A Post First Grade Comparison between the Experimental (E_4 vs E_5) and between the Control (C_4 vs C_5) Groups of Verbal Stories on Number of Sentences and Mean Length of Remark 91

Table 62 A Post Second Grade Comparison between the Experimental (E_5) and Control (C_5) Groups on the Picture Story Language Test 93

Table 63 A Post First Grade Comparison between the Experimental (E_4) and Control (C_4) Groups on the Picture Story Language Test 93

Table 64 A Post Second Grade Comparison between the E_5 and C_5 Groups on the Wepman Auditory Discrimination Test 94

Table 65 A Post First Grade Comparison between the Experimental (E_5) and Control (C_5) Groups on Mathematics Measures 97

Table 66 A Post First Grade Comparison between the Experimental (E_5) and Control (C_5) Groups on the Mathematics Performance Measure 100

Table 67 A Post Second Grade Comparison between the Experimental (E_5) and Control (C_5) Groups on Mathematics Measures 101

Table 68 Post Second Grade Medians, Means, and Standard Deviations of the Experimental (E_5) and Control (C_5) Groups on the Mathematics Performance Measure 103

Table 69 Post Second Grade Frequency Distribution between Experimental (E_5) and Control (C_5) Groups on Mathematics Performance 105

Table 70 A Post First Grade Comparison between the Experimental (E_4) and Control (C_4) Groups on Mathematics Measures 107

Table 71 A Post First Grade Comparison between the Experimental (E_4) and Control (C_4) Groups on the Mathematics Performance Measure 108

Table 72 A Post First Grade Comparison between the Experimental (E_4 vs E_5) and between the Control (C_4 vs C_5) Groups on the Mathematics Performance Measure 109

Table 73 A Post Kindergarten Comparison between the Experimental (E_5) and Control (C_5) Groups on Teacher Ratings 110

Page

Table 74 A Post First Grade Comparison between the Experimental (E_5) and Control (C_5) Groups on Teacher Ratings 111

Table 75 A Post Second Grade Comparison between the Experimental (E_5) and Control (C_5) Groups on Teacher Ratings 112

Table 76 A Post Kindergarten Comparison between the Experimental (E_4) and Control (C_4) Groups on Teacher Ratings 113

Table 77 A Post First Grade Comparison between the Experimental (E_4) and Control (C_4) Groups on Teacher Ratings 114

Table 78 A Post Kindergarten Comparison between the Experimental (E_4 vs E_5) Groups and between the Control (C_4 vs C_5) Groups on Teacher Ratings 115

Table 79 A Post First Grade Comparison between the Experimental (E_4 vs E_5) and between the Control (C_4 vs C_5) Groups on Teacher Ratings 116

Table 80 A Post Second Grade Comparison between the Experimental (E_5) and Control (C_5) Groups on School Grades 117

Table 81 A Post Kindergarten Comparison between the Experimental (E_5) and Control (C_5) Groups on the Bender Gestalt 118

Table 82 A Post First Grade Comparison between the Experimental (E_5) and Control (C_5) Groups on the Bender Gestalt 118

Table 83 A Post Second Grade Comparison between the Experimental (E_5) and Control (C_5) Groups on the Bender Gestalt 119

Table 84 A Post Nursery School Comparison between the Experimental (E_4) and Control (C_4) Groups on the Bender Gestalt 119

Table 85 A Post Kindergarten Comparison between the Experimental (E_4) and Control (C_4) Groups on the Bender Gestalt 121

Table 86 A Post First Grade Comparison between the Experimental (E_4) and Control (C_4) Groups on the Bender Gestalt 121

Table 87 A Post Kindergarten Comparison between the Experimental (E_4 and E_5) and Control (C_4 and C_5) Groups on the Bender Gestalt 122

Table 88 A Post First Grade Comparison between the Experimental (E_4 and E_5) and Control (C_4 and C_5) Groups on the Bender Gestalt 122

Table 89 A Post Second Grade Comparison between the E_5 and C_5 Groups on the I See Me Feel Self Concept Test 124

Page

Table 90 A Post First Grade Comparison between the E_4 and C_4 Groups on the I See Me Feel Self Concept Test 124

Table 91 A Post Second Grade Comparison between the E_5 and C_5 Groups on the Rosenzweig Picture Frustration Test 125

Table 92 A Post First Grade Comparison between the Experimental (E_4 and E_5) and Control (C_4 and C_5) Groups on Parental Ratings of Children's Academic Behavior 127

Table 93 A Post Second Grade Comparison between the Experimental (E_5) and Control (C_5) Groups on Parental Ratings of Children's Academic Behavior 128

List of Figures

		Page
Figure 1	Design of Project	3
Figure 2	Schematic Diagram of Experimental and Control Groups	11
Figure 3	A Longitudinal Comparison between the Experimental (E_5) and Control (C_5) Groups on the Stanford Binet	23
Figure 4	A Longitudinal Comparison between the Experimental (E_5) and Control (C_5) Groups on Mental Age in Relation to Chronological Age (CA)	31
Figure 4a	A Comparison between the Experimental (E_5) and Control (C_5) Groups on Mental Age Gain	31
Figure 5	A Longitudinal Comparison between the Experimental (E_4) and Control (C_4) Groups on the Stanford Binet	36
Figure 6	A Longitudinal Comparison between the Experimental (E_4) and Control (C_4) Groups on Mental Age in Relation to Chronological Age (CA)	41
Figure 6a	A Comparison between the Experimental (E_4) and Control (C_4) Groups on Mental Age Gain	41
Figure 7	A Longitudinal Comparison between the Experimental (E_4, E_5) and Control (C_4, C_5) Groups on the Stanford Binet	45
Figure 8	A Longitudinal Comparison between the Experimental (E_4, E_5) and Control (C_4, C_5) Groups on Mental Age in Relation to Chronological Age (CA)	48
Figure 8a	A Comparison between the Experimental (E_4, E_5) and Control (C_4, C_5) Groups on Mental Age Gain	48
Figure 9	A Longitudinal Comparison between the Experimental (E_4, E_5) and Control (C_4, C_5) Groups on the Stanford Binet (Pre-Test) and the WISC VIQ (Post Test)	51
Figure 10	A Longitudinal Comparison between the Experimental (E_5) and Control (C_5) Groups on the Stanford Binet (Pre-Kindergarten) and the Primary Mental Abilities (Post-Second Grade)	52
Figure 11	A Post-First and Second Grade Comparison between the Experimental (E_4, E_5) and Control (C_4, C_5) Groups on the Reading Subtest of the Stanford Achievement Test I & II	69
Figure 12	A Post-First and Second Grade Comparison between the Experimental (E_4, E_5) and Control (C_4, C_5) Groups on the Verbal Meaning Subtest of the Primary Mental Abilities Test I & II	70

		Page
Figure 13	A Post-Second Grade Comparison between the Experimental (E_5) and Control (C_5) Groups on the Spache Diagnostic Reading Test	73
Figure 14	A Post-First Grade Comparison between the Experimental (E_4) and Control (C_4) Groups on the Spache Diagnostic Reading Test	75
Figure 15	A Post-Second Grade Frequency Distribution Comparing the E_5 and C_5 Groups on the Wepman Auditory Discrimination Test Scores	95
Figure 16	A Post First Grade Comparison between the Experimental (E_4, E_5) and Control (C_4, C_5) Groups on the Arithmetic Subtest of the Stanford Achievement Test I, and the Number Facility Subtest of the Primary Mental Abilities I	98
Figure 17	A Comparison between the Experimental (E_4, E_5) and Control (C_4, C_5) Groups on the Arithmetic Subtest of the WISC	99
Figure 18	A Post-Second Grade Comparison between the Experimental (E_5) and Control (C_5) Groups on the Achievement Subtests of the Stanford Achievement Test II (one year after termination of the LiLP)	102
Figure 19	A Longitudinal Comparison between the Experimental (E_5) and Control (C_5) Groups on the Bender Gestalt (BG)	120
Figure 20	A Longitudinal Comparison between the Experimental (E_4) and Control (C_4) Groups on the Bender Gestalt	123
Figure 21	A Longitudinal Comparison between the Upper One-Third (U_1) Experimental (E_4, E_5) and Control (C_4, C_5) Groups on the Stanford Binet	131
Figure 22	A Longitudinal Comparison between the Middle One-Third (M_1) Experimental (E_4, E_5) and Control (C_4, C_5) Groups on the Stanford Binet	132
Figure 23	A Longitudinal Comparison between the Lower One-Third (L_1) Experimental (E_4, E_5) and Control (C_4, C_5) Groups on the Stanford Binet	133
Figure 24	A Longitudinal Comparison between the Upper One-Third (U_1) and Lower Two-Thirds (L_2) Experimental (E_4) and Control (C_4) Groups on the Stanford Binet	135
Figure 25	A Longitudinal Comparison between the Upper One-Third (U_1) and Lower Two-Thirds (L_2) Experimental (E_5) and Control (C_5) Groups on the Stanford Binet	136

Appendix

	Page
Individual Raw Data Collected for E_4 Group During 3 Years in Experimental Learning to Learn Program starting at Age 4 (Nursery School Level) Fall 1968 to Age 7 (Post First Grade) Spring 1971	A-1
Individual Raw Data Collected for C_4 Group During 3 Years as Controls in Day Care Centers and Public Schools starting at Age 4 (Nursery School Level) Fall 1968 to Age 7 (Post First Grade) Spring 1971	A-11
Individual Raw Data Collected for E_5 Group during 2 Years in Experimental Learning to Learn Program starting at Age 5 (Kindergarten Level) Fall 1968 to Age 7 (Post First Grade), plus 1 Year in Public Schools to Age 8 (Post Second Grade) Spring 1971	A-21
Individual Raw Data Collected for C_5 Group during 3 Years as Controls in Public Schools starting at Age 5 (Kindergarten Level) Fall 1968 to Age 8 (Post Second Grade) Spring 1971	A-32
The Illinois Test of Psycholinguistic Abilities	A-43
The Bender Gestalt Test	A-44
Primary Mental Abilities Test	A-45
The Metropolitan Readiness Tests	A-47
Stanford Achievement Test	A-49
Scoring Criteria for Mathematics Measure	A-52
Creativity Rating Criteria	A-53
Teacher Rating Scale	A-55
Diagnostic Reading Scales	A-57
Auditory Discrimination Test	A-58
Picture Story Language Test	A-59
The Children's Form of the Rosenzweig Picture-Frustration Study	A-60

List of Standard Abbreviations for Tables and Text

1. Arith. - Arithmatic subtest of WISC
2. AVA - Auditory Vocal Association Subtest of ITPA
3. bet. - between
4. CA - Chronological Age
5. Comp. - Comprehension subtest of WISC
6. control - control groups who had:
   - C_4 - traditional day care nursery school, Title I Kindergarten and public school first grade
   - C_5 - Title I kindergarten and public school first and second grade
7. Diff. - Difference
8. Experimental - Experimental groups who participated in the LTLP:
   - E_4 - during nursery, kindergarten, and first grade
   - E_5 - during kindergarten and first grade. They attended public schools during second grade.
9. Grp. - Group
10. Inf. - Information subtest of WISC
11. ITPA - The Illinois Test of Psycholinguistic Abilities
12. LA - Language Age
13. LTLP - The Learning to Learn Program
14. MA - Mental Age
15. MRT - Metropolitan Readiness Test
16. mths. - Months
17. N - Number of participants in study
18. PMA - The Primary Mental Abilities Test
19. Pre K - Pre Kindergarten
20. Pre N - Pre Nursery
21. Post K - Post Kindergarten
22. Post N - Post Nursery
23. Post 1st - Post first grade
24. Post 2nd - Post second grade
25. SAT - Stanford Achievement Test
26. SBMA - Stanford Binet Mental Age
27. SBIQ - Stanford Binet Intelligence Quotient
28. SD - Standard deviation from the mean
29. Sim. - Similarities subtest of WISC
30. SRST - The School Readiness Screening Test
31. VD - Visual Decoding subtest of ITPA
32. VE - Vocal Encoding subtest of ITPA
33. VIQ - Verbal Intelligence Quotient of the WISC
34. VMA - Visual Motor Association Subtest of ITPA
35. Vocab. - Vocabulary subtest of WISC
36. WISC - Wechsler Intelligence Scale for Children
37. YATLTLP - Years after termination of the Learning to Learn Program
38. YLTLP - Years in the Learning to Learn Program
39. $>$ - greater than
40. $<$ - less than
41. $\bar{X}$ - Mean
42. $\bar{X}$ Age - Mean Age

Acknowledgements

The completion of the study depended on the help and cooperation of many people from the Duval County School System, the Learning to Learn School and the University of Florida. If I were to mention everyone who had a hand in this study the list would be very long. I would like to acknowledge a few people for their special help. In the Duval County School system particular thanks is due to the principals and the teachers whom we found to be most helpful and cooperative.

Three principals in particular deserve to be mentioned. They are Lurana Creveling, San Jose Elementary School; Conrad McLachlen, Spring Park Elementary School; and Juanita Wilson, Hendricks Avenue Elementary School.

The total staff of the Learning to Learn School contributed significantly throughout this study. Considerable effort was extended by Herb and Joan Sprigle, Suzanne Judd, Mrs. Gary Kirk, and Trich Schondelmaier.

At the University of Florida special thanks goes to the project staff of Shirley Guerry, Eileen DeMoully, Mike Resnick, and Hani Van De Riet. Others who helped in the project were Dick Dolder, Billy Finch, Liz Haynes, Eddy Roberts, Paul Shagoury, Don Taylor, Quenn Martin, Kathy Nadeau, Cathe Bedard, and Lynn McDonald.

Finally, a note of thanks is due to the children who participated in the project and to their parents.

Currently there is considerable attention focused on the development of new curricula and materials for early childhood education. The impetus for this interest comes from (1) the need for new programs for the culturally deprived child and (2) the evidence from recent research which questions some previously held assumptions concerning the optimal environment for the overall development of the child.

One questionable assumption is that the child is not ready to think, reason, or deal with organized learning material until the primary grades. This assumption has been vividly expressed by Rudolph and Cohen (1964) who state ". . . children of kindergarten age are not quite ready for organized, sequential, academic instruction in reading, writing, and arithmetic, largely as a matter of their overall development at age five. . . . teachers of young children are morally bound to protect the rights of every generation to normal maturing (p. 380)." Recent evidence (Bruner, 1960, 1966; Caldwell, 1968; Denenburg, 1970; Hess and Bear, 1968; Ojemann, 1963; and Wann,1962), however, indicates that the young child's strength, potential, and desire to learn have been underestimated.

A second such assumption is that the major function of early education is to facilitate the social and emotional development of the child, with comparatively less emphasis on cognitive development. This leads to school programs that focus on socialization, school readiness skills, and an abundance of unsequenced play experiences. A related belief of this approach is that an early childhood program focusing on intellectual development is likely to occur at the expense of the child's social and emotional development. This criticism has been answered by Robinson (1968) who states "it is difficult to see how pleasant experiences, stimulating within reasonable limits, can be harmful either to mental health or to cognitive development. One need not deny that sound emotional development is important to contend that optimum intellectual growth is also important. The two are apparently intertwined, with development in the emotional sphere, in part a function of development in the intellectual realm, and vice versa (pp. 44-45.")

A third assumption or approach in question is that the young child must initially acquire factual knowledge or content in order to develop adequate learning skills for later school success (Bereiter and Engelmann, 1966). However, in an increasingly complex world it may well be that the abilities to solve problems and to creatively explore the universe are more fundamental than the ability to accumulate present knowledge. Therefore, the child must learn how to learn in addition to learning content.

In view of recent research and thinking it seemed worthwhile to design and operate an early childhood education program organized so that it (1) is appropriate to the stage of cognitive development of the child, (2) makes maximal use of the child's abilities, (3) uses a planned sequence of environmental stimulation based on a knowledge of the stages of cognitive development, (4) emphasizes the process of learning, (5) guides and structures the learning experiences with the goal of self-support and coping on his own rather than presenting the child with a large amount of random, unorganized stimulation.

The purpose of this project was to continue the sequential learning program begun in September, 1968 with four- and five-year-old children. The long term plan was for these children to be kept in a continuous sequential program through the first grade. The project has two separate aspects. One is the application of the Learning to Learn Program at the laboratory school. The second is the evaluation and follow-up of this project. The purpose of the evaluation study is (1) to compare and contrast the development of the children who receive a two year preschool program (Group E_4 - those who began the sequential program at age four) with those who receive a one year preschool program (Group E_5 - those who began at age five); (2) to compare and contrast the development of the experimental groups with that of the control groups (Groups C_4 and C_5) who were matched with the experimental groups in intelligence, language ability, perceptual-motor ability, and socio-economic status.

Another aspect of this project is a systematic attempt to learn how differing lengths of exposure to the Learning to Learn Program influence the child's learning. This is of significance because there is a real question about the lasting effects of early education programs for children from a lower socio-economic background. This project may determine whether the commonly found loss of developmental gains after leaving special programs can be avoided by providing these children with longer exposure to a special early education program. Thus the overall design calls for one group of children to be in the Learning to Learn Program for three consecutive years, and another group for two consecutive years. There are data already available of the effects on a group who were in the program for one year of kindergarten after which they entered primarily black neighborhood schools. (See OEO Reports on Contract No. 1389 and Contract No. B89-4425). It is hoped that the long term effects of exposure to a sequential program can be assessed by following these children as they progress through school.

Several other early education programs have been developed, each differing considerably from the Learning to Learn Program. These programs have been described elsewhere and a description of them and comparison with the Learning to Learn Program is not feasible here. Some excellent sources for these programs are: Hess and Bear, 1968; Caldwell and Richmond, 1964; Deutsch, 1965, 1967; Gray and Klaus, 1965; Klaus and Gray, 1968; Rambusch, 1962; Weikart, Kamii, and Radin, 1964; Hechinger, 1966; Bereiter and Engelmann, 1966.

Objectives

The objectives of the demonstration program are as follows:

1. to complete a two year and a three year continuous sequential curriculum based upon concepts and structures which have been identified as basic to the overall development of young children.

2. to change the traditional role and function of the teacher as follows:

a. from lecturer and instructor to evaluator
b. from expository teaching to teaching via inquiry and exploration.

3. to change the traditional role and function of the pupil by emphasizing:

a. greater development in cognitive control; i.e., attention, concentration, delay before responding, reflection, etc.
b. more persistence and effort on achievement tasks
c. greater skill in developing strategies to solve problems and in making decisions
d. more balanced development of academic, recreative, and social skills.

4. to accommodate individual differences in the rate and level of learning by the use of small group and individual learning situations.

5. to involve parents in the education and cognitive development of their children by pointing out specific methods, techniques and activities which can be used at home to facilitate the learning process.

6. to provide the teacher an opportunity to work with small groups and individual students by utilizing teacher assistants.

The Theoretical Basis of the Program

The Learning to Learn Program was conceived and developed on the premise that the primary objective of early childhood education is to help the child learn to learn. This premise leads to the following eight basic principles or premises underlying the Learning to Learn Program:

(1) The child must be an active participant in the acquisition of knowledge and be given a major share of the work in the learning situation. Active physical, verbal, and mental participation of the child whenever possible is encouraged.

(2) The child must receive feedback that the application of his knowledge has made a contribution to himself and someone else. Such a realization builds self-confidence and self-worth. This feedback can be in the form of praise for appropriate learning activity, clues as to how to go beyond where he is with a task, correction of errors, etc.

(3) The internal satisfaction and feelings of adequacy that develop from the knowledge that he can cope with and master his environment stimulate the child's growth toward independence and achievement. The child is therefore encouraged to do as much learning as possible by discovery through his own activity.

(4) Learning becomes more meaningful to the child when it is in the form of a problem which challenges him and sparks his curiosity. The emphasis is placed on the process of problem solving and not on the accuracy of the solution. Such an approach encourages decision making and the development of flexible cognitive sets and strategies for learning without fear of failure and disapproval.

(5) The verbal symbols, concepts, skills and attitudes learned will more readily become a part of the permanent repertoire of intelligent behavior if they are immediately useful and helpful in the child's everyday world. Therefore, the content of the curriculum is built around material from the child's environment.

(6) The child must be exposed to opportunities for the interaction of multiple sensory and motor activities and the accurate labeling and communication of the information received. Each new learning task is presented through as many sense modalities as is possible. The child is usually fascinated with the realization that he can internalize an external process, organize it, and then report it to a listener who understands the logic of his thoughts. This is especially intriguing when the data processed are from sources other than the eyes and ears.

(7) Learning experiences for the child take on value not in mere exposure but in their timing, continuity, and the ways they are structured. Each new learning task is built on previous tasks and goes one step beyond them. Appropriate timing and sequencing of experiences regulate the amount and intensity of stimulation, provide an atmosphere that lends itself to attention, concentration, and greater sensitivity to the structure of the experiences. This approach assures that the child is moving forward by providing a hierarchical structure of learning experiences.

(8) Motivation to keep the child interested in the learning materials is accomplished by presenting most of the learning in game form where the child is an active participant in the game.

These eight principles have been shaped by a knowledge of child development, education, learning, and by daily observations of teacher's and children's behavior and their interaction during the six year experimental use of the Learning to Learn Program.

The organization of the Learning to Learn Program was built on the assumption that cognitive growth and development proceed in an orderly sequence with periods of transition. It was assumed, on the basis of past research, that the sequence proceeds from motor to perceptual to symbolic aspects of cognitive functioning. In the motor stage the child's first cognitive working concern is in manipulating the world through actions. By establishing a relationship between experience and action, the child becomes aware of certain surface features by which he can identify

the objects with which he works and the world around him. Through his perception of the world around him he learns the relationships between the various things he observes. He must be given the opportunity to perceive, recognize, categorize, and discover relationships. This leads to the stage of symbolic formation which enables the child to talk about and deal with things and ideas in the abstract, or in the absence of any tangible objects or relationships. With the acquisition of the ability to communicate verbally comes the capacity to recall the past, represent the present, and to think about the future and the "possible." Language becomes a vitally important tool for thinking, reasoning, and communicating things that the child has not said or heard before.

With the establishment of the program within a theoretical framework, the next essential step toward putting the theory to work was to determine where most four- or five-year-olds are with respect to their development. Psychological and educational literature provided quite clear evidence in this regard. A more challenging step was the necessity for translating theory and research into practical content which would facilitate a child's progress through the developmental sequence.

The natural choice for something to motivate, stimulate, and appeal to children was the use of games or a game atmosphere. The games employed in this program were constructed around five content areas (clothing, food, animals, furniture, transportation) and chosen because examples of this content are familiar to children of all socio-economic backgrounds and because they are readily available as real or miniature three-dimensional objects.

By beginning with a few examples of each content area and gradually expanding to include more members of the class, it was possible to develop a variety of games and activities, each of which is one step beyond the previous one and each of which incorporates the experiences and knowledge acquired by the child. Each of the five areas is sequenced in such a way that it is revisited and repeated in a variety of ways. Each time, however, the game or activity becomes less concrete and more abstract. The real orange, for example, is replaced by a picture of an orange as the only stimulus, and finally, the games are highly verbal and require statements about an orange. Every game or activity engages the child in some kind of active interplay of manipulation, perception, and verbalization.

This gradual transformation of overt action into mental operations is a direct consequence of Piaget's key tenet that stable and enduring cognitions about the world come about only through a very active commerce with this world on the part of the knower (Flavell,1963, p. 367).

It should be pointed out, however, that the goals of the program go beyond competence in manipulating language. The program gives the child an opportunity for the development of strategies of gathering information, problem-solving, and decision making. The skills and concepts children acquire are as follows:

1. Information gathering and processing through the use of all the senses
2. Observation, identification, and labeling of objects
3. Attention to and concentration on attributes that discriminate one object from another (what makes a pear a pear)
4. Classification
5. Identification of classes and sub-classes
6. Identification and classification on the basis of reduced clues
7. Encouragement by the use of guesses and hunches
8. Decision making
9. Use of past learning to make decisions
10. Problem solving
11. Reasoning by association, classification, and inference
12. Anticipation of events and circumstances
13. Expression of ideas
14. Imagination and creativity
15. Conventional (in contrast to idiosyncratic) communication
16. Operations on relationships
17. Exploration of numbers and space

It can be seen that while the program exposes children to experiences that will gently nudge them along in their development, it also equips them with tools and techniques which enable them to learn how to learn. The emphasis on creative exploration is in vivid contrast to Montessori programs which restrict the child to classification and description of the world around him. An important advantage of the Learning to Learn approach is that it makes the child more independent since his past experiences help him master new situations. His greater maturity is evident in his increasing reliance upon his own resources and decreasing dependence on the teacher. He experiences tremendous satisfaction from the knowledge that he knows how to solve problems and to grow independently.

Two teachers, and two classroom areas are necessary. One room is large enough to accommodate a class engaged in a variety of activities. A smaller room is used by one teacher for short sessions devoted to the planned sequential activities. Here the size of the group is limited to four children who are homogeneous with respect to level and rate of learning. The careful use of groups is in accord with Piaget's second major implication for education.

> "If social cooperation is thus one of the principal formative agents in the spontaneous genesis of child thought, it is an imperative necessity for modern education to make use of this fact by according an important place to socialized activities in the curriculum." (Aebli, 1951, p. 60)

Considerable emphasis is placed on the creation of a favorable learning atmosphere. The other children must show the learner (player) respect by being quiet so he can "think with his brain" (make observations, organize information and also his thoughts before responding). With such an emphasis it soon becomes apparent to the child that he is important and that what he is trying to achieve is worthwhile.

For a more complete description of the Learning to Learn Program including the step by step curriculum, program content, teacher instructions, etc., the reader is referred to Sprigle (1967) and Sprigle (1969).

Design of Project

During the 1968-69 school year two groups of children entered the experimental program and two control groups were selected. (See Figure 1)

Figure 1

Design of Project

Year	Grade	Age	Group Status		Grade	Age	Group Status	
1970-71	1st	6	E^*_4	C_4	2nd	7	E^{**}_5	C_5
1969-70	K	5	E^*_4	C_4	1st	6	E^*_5	C_5
1968-69	N	4	E^*_4	C_4	K	5	E^*_5	C_5

Disadvantaged Children

E_4 N = 23 E_5 N = 21

C_4 N = 21 C_5 N = 21

* In Learning to Learn Program - Experimental (E_5 and E_4)

** Children attended public schools in Duval County

E = Experimental groups who participated in the Learning to Learn Program:
E_4 during nursery, kindergarten, and 1st grade
E_5 during kindergarten and 1st grade. They attended public schools during the second grade.

C = Control Groups who had:
C_4 traditional day care nursery school, Title I kindergarten and public school 1st grade.
C_5 Title I kindergarten and public school 1st and 2nd grade.

Children were drawn from the same disadvantaged neighborhood in Jacksonville. Two five-year-old groups were selected with the experimental group (E_5) attending the Learning to Learn School and the control group (C_5) attending public school kindergarten in Duval County, Florida. Two four-year-old groups were selected with the experimental group (E_4) attending the Learning to Learn School and the control group (C_4) attending OEO sponsored day care centers in Jacksonville.

During the 1969-70 school year, group E_5 was in first grade at the Learning to Learn School, group C_5 was in first grade in Duval County public schools, group E_4 was in kindergarten at the Learning to Learn School and group C_4 was in kindergarten in Duval County public schools. During 1970-71 school year, groups E_5 and C_5 attended second grade in Duval County public schools, group E_4 was in first grade at the Learning to Learn School, and group C_4 was in first grade in Duval County public schools. This evaluation report is on the data collected on all four groups following the first three years of the project through the spring of 1971.

The evaluation and data collection relating to the fourth year of the project (after termination of the Learning to Learn Program) will be completed during 1971-72 school year.

Objectives and Hypotheses of the Evaluation Program

The purpose of this follow-up study is to determine the differential development of the four groups of children, E_4, C_4, E_5, C_5 at the end of first grade (E_4 and C_4 groups) and at the end of second grade, one year after termination of the Learning to Learn Program (E_5 and C_5).

It is hypothesized that the children participating in the Learning to Learn Program (E_4 and E_5 groups) will be developmentally superior to the children in the control groups (C_4 and C_5 groups) as measured by a wide variety of developmental measures. It is further hypothesized that:

1. Group E_4 will be developmentally superior to group E_5 at the end of the Learning to Learn Program (through first grade).

2. Group E_4 will be developmentally superior to the control group C_4 at the end of each year of the Learning to Learn Program.

3. Group E_5 will be developmentally superior to control group C_5 at the end of the Learning to Learn Program (first grade) and at the end of second grade, one year after intervention with the Learning to Learn Program.

Specific Hypotheses

The specific hypotheses for the third year of the project are that at the end of first grade in the Learning to Learn Program, group E_4 will be superior to the control group C_4 and that at the end of second grade (one year after termination of the Learning to Learn Program) group E_5 will be superior to group C_5 in the following developmental characteristics:

(1) general intelligence
(2) ability to express ideas
(3) language comprehension
(4) verbal reasoning ability

(5) concept formation
(6) creativity and imagination
(7) achievement motivation
(8) school achievement
(9) parental involvement and attitudes in the education of their child (groups E_4 and C_4 only)

Instruments

The instruments that were used to measure the developmental characteristics of the children at the end of the third year of the project were as follows:

Instruments	Developmental Characteristics
1. Stanford Binet Intelligence Scale Form L-M (Terman and Merrill, 1960)	General intelligence
2. The Illinois Test of Psycholinguistic Abilities (McCarthy and Kirk, 1961), Vocal Encoding Subtest	The ability to express ideas
3. The Illinois Test of Psycholinguistic Abilities, Auditory-Vocal Association Subtest	Language comprehension
4. The Illinois Test of Psycholinguistic Abilities, Visual-Decoding Subtest	Verbal reasoning ability
5. The Illinois Test of Psycholinguistic Abilities, Visual-Motor Association Subtest	Concept formation
6. Ratings of written and spoken stories made by children	Language quality, quantity, performance, creativity, concrete and abstract usage
7. Ratings by teachers and observation	Achievement motivation
8. The Stanford Achievement Test	School achievement
9. Parental Questionnaires (E_4 and C_4)	Parental attitudes and involvement in the education of their child
10. Bender Gestalt	Perceptual Motor Ability
11. Primary Mental Abilities	Perceptual Speed, Verbal Meaning, Spatial Relations, Number Facility
12. Metropolitan Readiness Test	School Readiness

Instruments	Developmental Characteristics
13. Mathematics Performance Measures	Abstract manipulation of symbolic mathematical problems
14. Spache Diagnostic Reading Scales	Reading Ability Level
15. Wepman Auditory Discrimination Test	Ability to discriminate verbal messages
16. Weschsler Intelligence Scale for Children (Verbal Subscale)	Abstract Verbal Ability General verbal intelligence
17. Rosenzweig Picture Frustration Test	Personality measure
18. I See Me Feel Self Concept Test	Attitude toward self and academics

Population and Sample

During the months of May and June, 1968, the children were identified through the school systems in the poverty areas, through contact with churches in the poverty areas, and by public announcements inviting parents who met the criteria to apply for enrollment in the program. The assistance of the welfare department and pediatricians in the community was also used to identify eligible families. The children for all four groups were selected from homes in the same deprived neighborhood of Jacksonville, Florida. With a few exceptions, the parents were employed at an occupational level below white collar worker. The initial testing and screening of subjects was conducted during the summer of 1968 at the Learning to Learn School in Jacksonville, Florida.

The subjects who participated in this project consisted of 44 four-year-old children and 42 five-year-old children.

Figure 2

Schematic Diagram of Experimental and Control Groups

Age 4 (started at nursery school level)	E_4 (N = 23)	C_4 (N = 21)
Age 5 (started at kindergarten level)	E_5 (N = 21)	C_5 (N = 21)

The children from each age level were divided into two groups (see Figure 2) matched on intelligence and perceptual-motor skills. (See Table 1 and 2).

Group E_4 consisted of 23 children who attended the Learning to Learn Program from September, 1968 through June, 1971 (beginning the program at age 4). These children have been exposed to three school years of the Learning to Learn Program (nursery, kindergarten, and first grade) and are enrolled in second grade in Duval County Public School for the 1971-72 school year.

The C_4 group (the control group for group E_4) consisted of 21 children (beginning at age 4) who attended day care centers during the 1968-69 school year. During the 1969-70 school year the C_4 children attended Title I kindergarten classes in the Duval County School system, and attended first grade in that school system during 1970-71 school year.

Group E_5 consisted of 21 children (beginning the program at age 5) who were exposed to two consecutive years of planned sequential program at the Learning to Learn School (kindergarten and first grade). These children were enrolled in the second grade in the Duval County school system during the 1970-71 school year.

Group C_5 (the control group for E_5) consisted of 21 children (beginning at age 5) who participated in a Title I kindergarten program in 1968-69. The C_5 group attended first and second grade in the Duval County Public Schools.

To control for intelligence and perceptual motor skills the two groups of four-year-old children (E_4 and C_4) had been matched at the beginning of the project (1968-69) on their performance on the Stanford Binet Intelligence Scale and the Seguin Form Board. A comparison of the scores of the two groups on these measures is presented in Table 1.

Table 1

Pre Program Means, S. D.'s and t's for the Learning to Learn Experimental Group (E_4) and their Controls (C_4) on the Stanford Binet and Seguin

		Pre Learning to Learn Program				
Measures	Grp.	N	$\bar{X}$ Age (mths)	$\bar{X}$ score	SD	t
Stanford Binet	E_4	23	51	87.7	11.9	
	C_4	21	49	88.1	7.0	-0.16
Seguin (time score)	E_4	23	51	75.8	28.2	
	C_4	21	49	66.4	32.2	1.01

The two groups of five-year-old children were also matched as closely as possible on the Stanford Binet, in school readiness skills as measured by the School Readiness Screening Test, on two subtests from the Illinois Test of Psycholinguistic Ability, and on their performance on the Seguin Form Board. These data are presented in Table 2.

Table 2

Pre Program Means, S.D.'s and t's for the Learning to Learn Experimental Group (E_5) and their Controls (C_5) on the Stanford Binet, ITPA, SRST, and Seguin

Pre Learning to Learn Program						
Measure	Grp.	N	CA (mths)	$\bar{X}$ score	SD	t
Stanford Binet	E_5	21	62	89.7	9.5	
	C_5	21	62	89.6	8.2	0.03
ITPA-Vocal Encoding	E_5	21	62	9.3	2.8	
	C_5	21	62	9.6	3.9	-0.22
ITPA-Auditory Vocal Assoc.	E_5	21	62	8.2	2.5	
	C_5	21	62	8.1	3.6	0.19
SRST	E_5	21	62	10.6	3.6	
	C_5	21	62	10.2	3.2	0.31
Seguin (time score)	E_5	21	62	49.1	18.6	
	C_5	21	62	44.7	18.4	0.75

Both the experimental (E_4 and E_5) and their control (C_4 and C_5) groups did not significantly differ from each other on any of the measures. The test scores for each subject are given in the Appendix.

Procedures

During the 1970-71 phase of the research program the E_4 group attended first grade at the Learning to Learn School. Their school day was devoted to exposing the children to a balance between formal learning activities and work-play situations.

First Grade Program Description

Children and their needs served as the central focus for organizing and designing the first grade program. We had in mind a classroom in which children were attracted and drawn to learning, attracted and drawn to each

other, and attracted and drawn to the teacher. We believed that if the surroundings, the material, and the people were familiar and promoted active involvement, first grade could take up where the kindergarten Learning to Learn Program had left off. In order to facilitate this, the children, the teacher, and aide all progressed to the first grade. The room was not the same, but the teacher and aide organized it in a fashion similar to the classroom of the previous year, utilizing the teaching practices and curriculum content which had worked so effectively the previous year. The program was designed to provide continuity with the kindergarten program and to establish early childhood education as the beginning of an educational process that brings consistency into educational planning.

The large classroom was divided into learning areas by partitioning with portable room dividers. There were listening, reading, typing and general activity areas, each with a variety of materials. The general activity area was the largest, using about half the classroom.

Individual chairs and tables were clustered in fours so children could easily discuss and talk with each other. Across the room two learning centers were separated with portable bulletin board dividers. One center was for typing and the other for listening. To reduce distractions and to encourage individual work in the listening center, six small cubicles made of heavy cardboard and glued to the table, provided each child with his own workspace and earphones were used. One corner of the room, partitioned off for the reading center, had a rug where the children sat or stretched out. There was also a library table. Books could be used anywhere in the room; in an isolated spot by one child or shared with someone else. The classroom had a special rug which separated the tables and chairs from the typing and listening centers. As a child finished his work he came to this rug where he and the teacher sat together to read or talk about it. Other children frequently sat in (or stretched out) on this close and personal get-together waiting their turn or just listening to or being with the teacher.

The roles of the teacher and aide were quite similar to their roles in the kindergarten program. There was no direct, instructional teaching of the traditional variety where the teacher is in front of the whole class. Instead, the teacher or aide worked with small groups of 4 or 5 children, usually on the floor or rug. While one was engaged in a small group learning activity, the other was available to the remaining children on an individual basis. Her job was to move about the classroom helping children who came to her, going to children whom she knew needed help getting started or changing from one activity to another. She also got small groups started at the listening tapes and sent small groups to the typewriter. Her other job was to maintain an interpersonal climate conducive to learning.

The children had freedom of movement and freedom of interaction during the school day. However, accompanying their freedom was a responsibility to themselves and others in the classroom. Their behavior and movement could not be disrupting or distracting to classmates and the teacher. The children had to select from and get involved with the activities and materials provided in the classroom or materials brought from home but which were relevant to the learning objectives.

Each child had a folder with work that had to be completed by the end of the day. Again, he could pace himself, but he had the responsibility to have it completed. In the folder was at least one typing paper, one listening paper and one reading paper. These folders were made up daily by the teacher and aide for each child. The number of papers and difficulty level was dependent upon the dhild's rate and level of learning. The teacher and aide were guided by the needs of each child and his developmental status when making decisions about the day's work. Consequently, not all children had the same work or same amount of work.

The children were permitted to pace themselves in getting this work finished. They could pause to pursue another activity in another learning area, just so long as their work load was completed by the end of the day. In addition to the work in the folder, they had an assignment at the listening, reading, and typing areas. The work of these areas was highly coordinated so that the learning activity on the listening tapes was related to the typing activity and reading and language activity.

The children's freedom to move about at will, to talk and work with each other was an integral part of the learning environment of the Learning to Learn Program. The social, language, and intellectual development fostered through this kind of working together were perhaps the most obvious but certainly not the only benefits derived from this classroom organization and management. By giving children the freedom, independence, and the responsibility to do as much for themselves and each other as they could, the teacher was free to help every child on an individual basis. Rarely did the class get together as a group. Most of the time it was teacher (or aide) and child working together at a time selected by the child.

The curriculum and curricular materials were structured sequentially and were continuous with the previous Learning to Learn Kindergarten Program. The major focus of the first grade curriculum was on the understanding and use of language (reading, writing, listening, speaking) and mathematics. There was frequent use of art as a means of creative writing and expression. Social studies and science were woven into the language and math activities.

The content of the curriculum - which combined numbers, language, social studies, science, and art - was a continuation of the five-year old program. The day began with math; with the children divided into

three groups. The aide worked with one group on the rug in the reading corner; the teacher had a second group on another rug; and a third group had a math activity on the listening tape. When finished, this group had a choice of activities until the teacher and aide finished their math lessons. The teacher then took this third group for math while the aide played math related games with the first two groups.

A game and activity centered approach with Cuisenaire Rods were used to teach math. Card and dice games, board games that require the child to guess, judge relationships, and solve problems gave children a personal and first-hand experience with numbers and operations.

Following a short break for a song or a moving-around activity the whole group came together on the rug. Here the teacher aroused the interest and curiosity of the group with a real-life experience which was familiar to everyone. The more the children participated in developing the activity, the more involved and thoughtful they became. When it appeared as though everyone understood the activity, and had his own ideas about how to proceed, the teacher turned everyone loose to follow his own individual lead. Everyone was on his own to extend the activity in his own direction and take as long as he wished to finish it. While they were free to work together, the individuality and diversity of the final products indicated the children treasured their own ideas more than the ideas of another child.

The activity was interesting because it allowed them to be active and involved with something they knew about from real life. It was challenging because they had to retrieve past knowledge from memory, then organize and think about it in a new way to fit the activity. They met the challenge successfully because of their opportunities the previous year to think, reason, generate ideas, and solve problems.

As five-year olds, art was frequently used to express ideas and to give new words concrete meaning. So it was logical and sensible to begin first grade with activities that involved drawing pictures and writing words. This led to pictures and sentences and then pictures and creative stories. While art remained a favorite means of expression for many children, others preferred just to write. They became so proficient at writing that they could take two unrelated words like <u>hen</u> and <u>church</u> and develop a creative story. By the end of the year two other favorite activities were interpreting works of art (the teacher borrowed prints from the local public library) and writing their own endings to stories. The teacher would pick a story that would confront people or animals with a predicament, conflict, or decision. She would read up to that point and stop. From there the child would take over.

Children were free to pace themselves with this activity. Some began and stayed with it until completion. Others paused to engage in another activity they selected and returned to the original task. As a child finished he came to the rug where he would talk about his picture and read the words, sentences or story he wrote. The teacher

did not correct the finished product in the usual sense of being right or wrong. She did, however, have a standard for each individual child. She knew the past performance of every child in the class and she expected the child to come up to his own past performance. She accepted his work but let the child know if that job was not typical of his past performances. She might say, "I can tell you worked hard to do this Claude and you did such a good job," or "I can tell you worked very fast and did not think with your brain because this does not look like Eric's work."

There was still another daily activity. Three or four children would go to the reading corner with the aide (or teacher). Here they would play dice games, card games, or board games with words and pictures. After they could recognize and use the words without the aid of the pictures, they read the words on sentence strips the teacher made. When the teacher felt the group understood the meaning of the words and could use them, she let them read from the linguistic reader.

Everything prepared for a particular day had a purpose and a direction. Everything was coordinated so that the learning activity on the listening tape was related to the typing activity and reading and language activities. The primary focus was on the understanding and use of concepts and symbols through first-hand experiences. Each child understood the meaning of and could use in a personal way the words he met up with in a book. Reading was not an isolated subject but was tied to art. social studies, science, and human relationships.

For a more complete description of the Nursery and Kindergarten Learning to Learn Program see Sprigle (1967, 1969).

The children of the C_4 control group were members of five different first grade self-contained integrated classes in the Jacksonville Public School System during the 1970-71 school year and were exposed to traditional first grade programs. Their educational programs consisted of group and individual activities designed to expose the children to a large variety of stimulation, concepts, and ideas. The programs emphasized self-help, socialization, sensory-motor activities, language, reading, writing and preliminary mathematics experiences.

The children of the E_5 group (who had completed two years of the Learning to Learn Program) and the C_5 children were members of ten different second grade integrated classes in the Jacksonville Public School System during the 1970-71 school year. The educational procedures of their schools consisted of homogeneous grouping in the academic subject areas and modular scheduling. A large proportion of the experimental (E_5) and control (C_5) children were enrolled in the same classes during their second grade educational experience.

Teachers of both experimental (E_5) and control (C_5) second grade children were pleasant and concerned about their students total development. They were knowledgeable and used currently accepted teaching

techniques. The general atmosphere of the classrooms for both the E_5 and C_5 children was one of order and control, with the activity level of the classroom relatively low, as the children were reminded regularly to sit down in their seats and work quietly. Reading and mathematics were taught in small groups; during these sessions the other children in the classes were seated at their desks or tables with workbook assignments.

In the spring of 1971, a research team from the University of Florida evaluated the experimental and control children with intellectual, linguistic, performance, and ability measures following the completion of the major portion of the academic school year.

RESULTS

Intelligence

Stanford Binet: Intelligence Quotient Comparisons between the Experimental (E_5) and Control (C_5) Groups

The means, standard deviations, and t values of the experimental (E_5) and control (C_5) groups on the Stanford Binet prior to the beginning of the Learning to Learn Program (LTLP) in 1968, are presented in Table 3. There was no significant difference between the two groups on their Pre-Learning to Learn Program (PLTLP) Stanford Binet scores. (t = .03).

Table 3

A Pre Learning to Learn Program Comparison between the Experimental (E_5) and Control (C_5) Groups on the Stanford Binet

PRE LEARNING TO LEARN PROGRAM								
Measure	Grp.	N	YLTLP	CA (mths)	SBIQ		Diff. bet. Grps.	t
				$\bar{X}$	$\bar{X}$	SD		
Stanford Binet	E_5	21	0	62	89.7	9.5		
	C_5	21	0	62	89.6	8.2	.1	.03

Table 4 indicates that by the end of kindergarten, after one year in the Learning to Learn Program, the experimental group scored significantly higher than the control group on Stanford Binet IQ. There was a 10.8 IQ point difference between the two groups. (t = 2.92, $p < .01$).

Table 4

A Post Kindergarten[1] Comparison between the Experimental (E_5) and Control (C_5) Groups on the Stanford Binet

POST KINDERGARTEN								
Measure	Grp.	N	YLTLP	CA (mths)	SBIQ		Diff. bet. Grps.	t
				$\bar{X}$	$\bar{X}$	SD		
Stanford Binet	E_5	21	1	71	98.8	10.9		
	C_5	21	0	70	88.0	12.6	10.8	2.92**

**$p < .01$

[1]After one year of the Learning to Learn Program

A post first grade comparison between the two groups on the Stanford Binet is presented in Table 5. At the end of two years in the Learning to Learn Program the E_5 group is 20 points higher on Stanford Binet IQ than their C_5 controls ($t = 4.18$, $p < .001$) with a mean IQ of 106.2 compared to one of 86.2 for the C_5 group.

Table 5

A Post First Grade[1] Comparison between the Experimental (E_5) and Control (C_5) Groups on the Stanford Binet

		POST FIRST GRADE						
Measure	Grp.	N	YLTLP	CA (mths) $\bar{X}$	SBIQ $\bar{X}$	SD	Diff. bet. Grps.	t
Stanford Binet	E_5	17	2	83	106.2	17.7		
	C_5	20	0	81	86.2	9.6	20.0	4.18***

***$p < .001$

[1]After two years of the LTLP

A post second grade comparison between the E_5 and C_5 groups on the Stanford Binet is presented in Table 6. One year after the termination of the Learning to Learn Program the experimental group attained a 17.7 point advantage over the control group which was significant at the .001 level. ($t = 3.61$).

Table 6

A Post Second Grade[1] Comparison between the Experimental (E_5) and Control (C_5) Groups on the Stanford Binet

		POST SECOND GRADE							
Measure	Grp.	N	YLTLP	YATOLTLP	CA (mths) $\bar{X}$	SBIQ $\bar{X}$	SD	Diff. bet. Grps.	t
Stanford Binet	E_5	16	2	1	94	104.8	17.6		
	C_5	20	0	NA	93	87.1	11.7	17.7	3.61***

***$p < .001$

[1]One year after termination of the LTLP

A pre-post comparison of the experimental (E_5) and control (C_5) groups on the Stanford Binet taken at the beginning of the Learning to Learn Program in 1968 and at the end of the second grade, one year after termination of the Learning to Learn Program, is presented in Table 7. The experimental group's mean IQ gain over two years of the Learning to Learn Program and one year of public school classes was 15.1 IQ points. The control group lost 2.5 IQ points over the same period of time. Thus with the pre-program mean IQ's of the groups being essentially the same (E_5 = 89.7; C_5 = 89.6), the mean IQ point difference between the two groups is 17.6 IQ points at the end of the second grade.

Table 7

A Pre Learning to Learn Program to Post Second Grade[1] Longitudinal Comparison between the Experimental (E_5) and Control (C_5) Groups on the Stanford Binet

		PRE-LTLP				POST SECOND GRADE[1]						
Measure	Grp.	N	YLTLP	SBIQ		N	YLTLP	YATOLTLP	SBIQ		IQ Gain or (loss)	t
				$\bar{X}$	SD				$\bar{X}$	SD		
Stanford Binet	E_5	21	0	89.7	9.5	16	2	1	104.8	17.6	15.1	4.92***
	C_5	21	0	89.6	8.2	20	0	NA	87.1	11.7	(2.5)	-1.18

***$p < .001$

[1]One year after termination of LTLP

Table 8 represents pre-post yearly comparisons of the E_5 and C_5 groups in relation to Stanford Binet IQ. During the first year of the Learning to Learn Program the experimental group gained 9.1 points, while their control group lost 1.6 IQ points. During the second year the experimental group increased their IQ significantly again with a mean gain of 7.4 IQ points. The control group on the other hand had a mean IQ decrease of 1.8 points from the previous year.

One year after termination of the Learning to Learn Program, with both groups in public schools, the experimental group's IQ remains relatively constant with a loss of 1.4 IQ points. The control group also remains relatively constant with an increase of .9 IQ points. Table 8 shows the change over time resulting in the difference of 17.6 IQ points between the E_5 and C_5 groups after the E_5 children have been out of the experimental program for one year.

Table 8

A Yearly Longitudinal Pre Learning to Learn Program to Post Second Grade[1] Comparison between the Experimental (E_5) and Control (C_5) Groups on the Stanford Binet

		PRE-LTLP		POST-K		POST-1st		POST-2nd[1]			
		1968		1969		1970		1971		Pre-LTLP to Post-2nd	
Measure	Grp.	SBIQ		SBIQ		SBIQ		SBIQ		SBIQ Gain or (loss)	t
		$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD		
Stanford Binet	E_5	89.7	9.5	98.8	10.9	106.2	17.7	104.8	17.6	15.1	4.92***
	C_5	89.6	8.2	88.0	12.6	86.2	9.6	87.1	11.7	(2.5)	-1.18

***$p < .001$

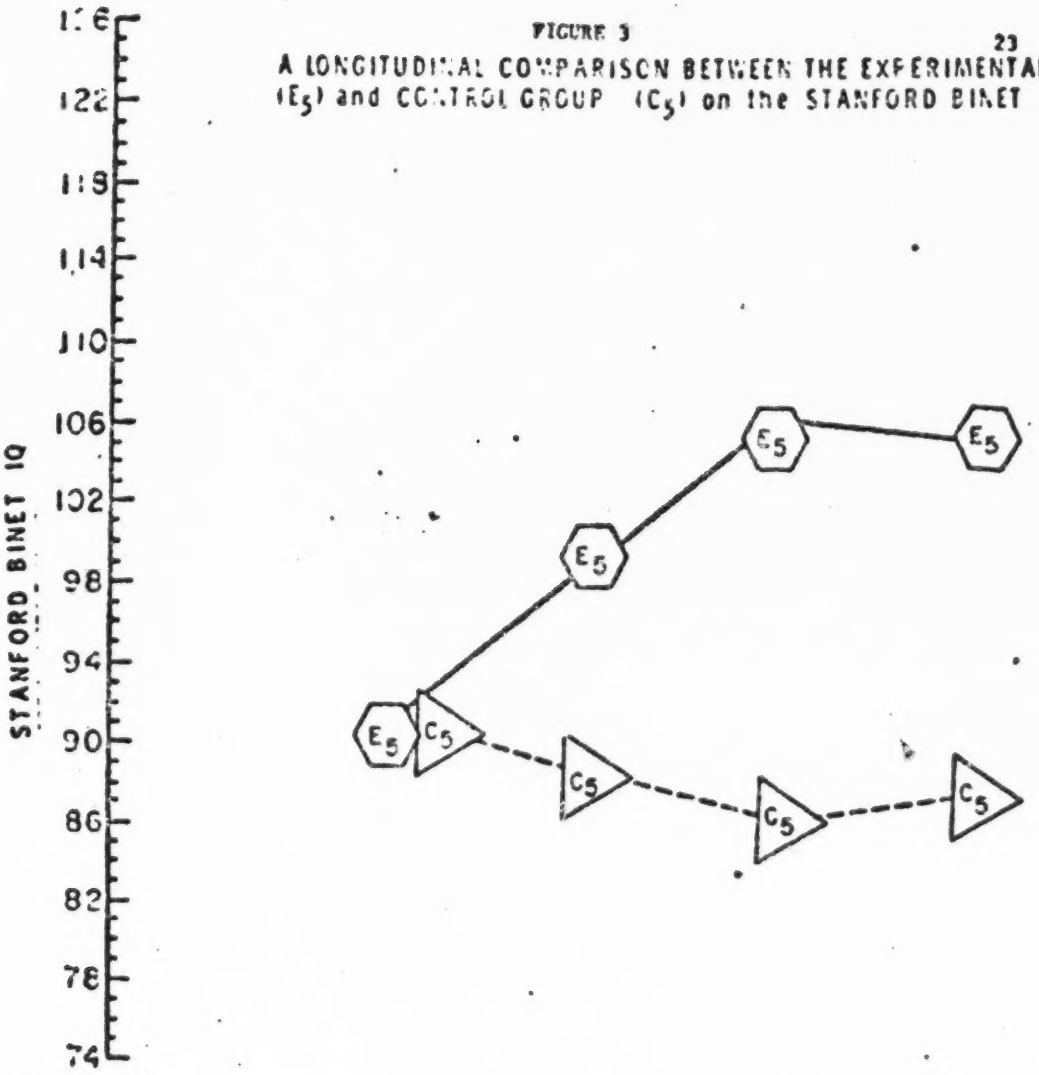
[1]One year after termination of LTLP

The E_5 and C_5 groups exhibit entirely different Stanford Binet IQ patterns over time. The E_5 group made approximately equal IQ gain over the first two years of the Learning to Learn Program and maintained the IQ gain one year after termination of the Learning to Learn Program. The C_5 group's performance was one of a slow decline in Stanford Binet IQ over the same period of time. This data is presented graphically in Figure 3.

In making these descriptive comparisons it is of interest to note the differences in the standard deviations of the E_5 and C_5 groups after the first and second grades. The E_5's standard deviations of 17.7 for post first grade and 17.6 for the following year closely approximate the standard deviation of the Stanford Binet (16.0), while the C_5's standard deviation for post first grade equals 9.6, and post second grade is 11.7. (Table 8)

FIGURE 3

A LONGITUDINAL COMPARISON BETWEEN THE EXPERIMENTAL (E_5) and CONTROL GROUP (C_5) on the STANFORD BINET



SBIQ Pre-Kind.	SBIQ Post-Kind.	SBIQ Post 1st Grade	SBIQ Post 2nd Grade (1yr. after termination of LTLP)
E_5 • 99	E_5 • 99	E_5 • 106	E_5 • 105
C_5 • 90	C_5 • 88	C_5 • 86	C_5 • 87

Stanford Binet: Mental Age Comparisons between the Experimental (E_5) and Control (C_5) Groups

In order to more clearly see the differential developmental patterns of the experimental and control children the Stanford Binet results were also analyzed on the basis of mental age growth.

Comparisons between the experimental (E_5) and control (C_5) groups on Stanford Binet Mental Age are presented in Table 9, 10, 11, 12, and 13. The results of Table 9 indicate there were no significant differences in SBMA between the two groups prior to the first year of the Learning to Learn Program (t = .48).

Table 9

A Pre Learning to Learn Program Comparison between the Experimental (E_5) and Control (C_5) Groups on Stanford Binet Mental Age

		PRE-LEARNING TO LEARN PROGRAM					
Measure	Grp.	N	YLTLP	CA (mths)	SBMA (mths)	MA > CA (mths)	t
				$\bar{X}$	$\bar{X}$		
Stanford Binet	E_5	21	0	62	57	-5	
	C_5	21	0	62	56	-6	.48

During the first year of the program (Table 10) the E_5 and C_5 groups had large differential gains in mental age. The E_5 group gained 14 Stanford Binet mental age months compared to a gain of 6 mental age months for the control children.

After one year in the Learning to Learn Program the experimental group had a Stanford Binet mental age equal to their chronological age. The control children had a mental age of 8 months less than their chronological age.

Table 10

A Pre Learning to Learn Program to Post Kindergarten[1] Comparison between the Experimental (E_5) and Control (C_5) Groups on Stanford Binet Mental Age

		PRE-LEARNING TO LEARN PROGRAM				POST-KINDERGARTEN						
Measure	Grp.	N	YLTLP	CA (mths) $\bar{X}$	SBMA (mths) $\bar{X}$	N	YLTLP	CA (mths) $\bar{X}$	SBMA (mths) $\bar{X}$	MA Gain (mths)	MA ? CA (mths)	t
Stanford Binet	E_5	21	0	62	57	21	1	71	71	14	0	13.3***
	C_5	21	0	62	56	21	0	70	62	6	-8	3.76**

**$p < .01$

***$p < .001$

[1] After one year of the LTLP

During the following year (post kindergarten to post first grade 1969-70,Table 11) the two groups again had differential gains in mental growth. The E_5 group gained 17 Stanford Binet mental age months while their control group only gained 9 mental age months. Thus after two years in the Learning to Learn Program there was a 15 Stanford Binet mental age months difference between the two groups. The experimental children had gained an average of 31 Stanford Binet mental age months compared to a gain of 15 mental age months for the control children. It is important to point out that after two years in the Learning to Learn Program the experimental group had a Stanford Binet mental age that was 5 months higher than their chronological age, while the control group had a mental age that was 10 months lower than their own chronological age.

Table 12 shows that one year after the termination of the Learning to Learn Program (post first grade to post second grade) the E_5 and C_5 groups each gained relatively the same amount on Stanford Binet mental age with an 11 and 12 months gain respectively. Thus after termination of the Learning to Learn Program the experimental group maintained most of its previous gains over the control group.

Table 13 represents a pre Learning to Learn Program to post second grade longitudinal comparison between the experimental (E_5) and control (C_5) groups on Stanford Binet mental age. At the end of the second grade the E_5 group had gained 43 mental age months compared to 27 for the C_5 group. One year after termination of the Learning to Learn Program there is still a 17 month mental age difference between the two groups.

Table 11

A Post Kindergarten to Post First Grade[1] Comparison between the Experimental (E_5) and Control (C_5) Groups on Stanford Binet Mental Age

		POST KINDERGARTEN				POST FIRST GRADE						
Measure	Grp.	N	YLTLP	CA (mths) $\bar{X}$	SBMA (mths) $\bar{X}$	N	YLTLP	CA (mths) $\bar{X}$	SBMA (mths) $\bar{X}$	MA Gain (mths)	MA ? CA (mths)	t
Stanford Binet	E_5	21	1	71	71	17	2	83	88	17	+5	9.18***
	C_5	21	0	70	62	20	0	81	71	9	-10	6.94***

***p< .001

[1]After two years of the LTLP

Table 12

A Post First to Post Second Grade[1] Longitudinal Comparison between the Experimental (E_5) and Control (C_5) Groups on Stanford Binet Mental Age

		POST FIRST GRADE				POST SECOND GRADE							
Measure	Grp.	N	YLTLP	CA (mths) $\bar{X}$	SBMA (mths) $\bar{X}$	N	YLTLP	YATLTLP	CA (mths) $\bar{X}$	SBMA (mths) $\bar{X}$	MA Gain (mths)	MA - CA (mths)	t
Stanford Binet	E_5	16	2	83	89	16	2	1	94	100	11	+6	4.93***
	C_5	20	0	81	71	20	0	NA	93	83	12	-10	5.80***

***$p < .001$

[1]One year after termination of the LTLP

Table 13

A Pre Learning to Learn Program to Post Second Grade[1] Longitudinal Comparison between the Experimental (E_5) and Control (C_5) Groups on Stanford Binet Mental Age

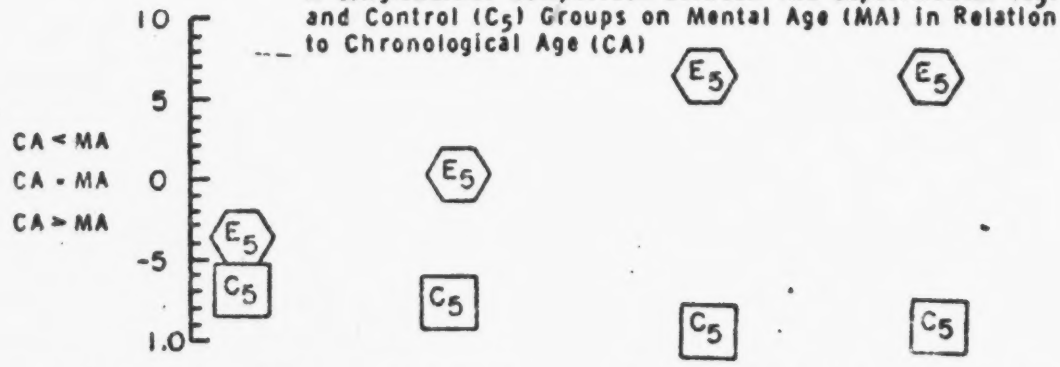
		PRE-LEARNING TO LEARN PROGRAM				POST SECOND GRADE							
Measure	Grp.	N	YLTLP	CA (mths) $\bar{X}$	SBMA (mths) $\bar{X}$	N	YLTLP	YATLTLP	CA (mths) $\bar{X}$	SBMA (mths) $\bar{X}$	MA Gain (mths)	MA < CA (mths)	t
Stanford Binet	E_5	21	0	62	57	16	2	1	94	100	43	+6	
	C_5	21	0	62	56	20	0	NA	93	83	27	-10	

[1]One year after termination of the LTLP

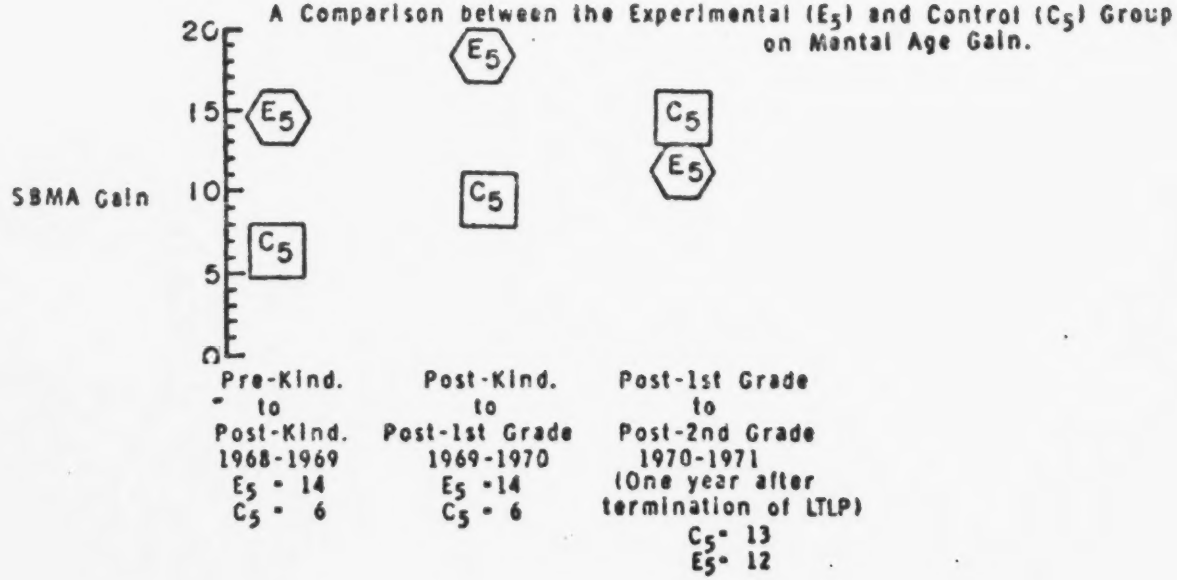
A longitudinal descriptive comparison between the E_5 and C_5 groups on mental age gain and the relationship between their chronological age and mental age is presented descriptively in Figure 4. The E_5 group moved from a mental age 5 months below their chronological age prior to the beginning of the Learning to Learn Program to a mental age 6 months greater than their chronological age one year after termination of the Learning to Learn Program. This pattern did not hold true for their control group. The C_5 group prior to entering kindergarten had a mental age 6 months less than their chronological age; after three years of educative process their mental age was 10 months below their chronological age. When examining the mental age gain patterns over time between the E_5 and C_5 group, it becomes quite apparent that differences do exist as a result of the Learning to Learn Program. During the kindergarten and first grade years the E_5 group gained 14 and 18 mental age months, while the control group gained 6 and 9 mental age months.

Figure 4

A Longitudinal Comparison between the Experimental (E_5) and Control (C_5) Groups on Mental Age (MA) in Relation to Chronological Age (CA)



A Comparison between the Experimental (E_5) and Control (C_5) Group on Mental Age Gain.



Stanford Binet: Intelligence Quotient Comparisons between the Experimental (E_4) and Control (C_4) Groups

The means, standard deviations and t values of the experimental (E_4) and control (C_4) groups on the Stanford Binet prior to the beginning of the Learning to Learn Program in 1968 are presented in Table 14. The difference between the means was less than one IQ point and was not statistically significant. ($t = -0.16$).

Table 14

A Pre Learning to Learn Program Comparison between the Experimental (E_4) and Control (C_4) Groups on the Stanford Binet

PRE-LEARNING TO LEARN PROGRAM								
Measure	Grp.	N	YLTLP	CA (mths)	SBIQ		Diff. bet. Grps.	t
				$\bar{X}$	$\bar{X}$	SD		
Stanford Binet	E_4	23	0	51	87.7	11.9		
	C_4	21	0	49	88.1	7.0	.4	-0.16

Table 15 indicates that after one year in the Learning to Learn Program the experimental group was statistically superior to their controls on Stanford Binet IQ. ($t = 7.09$, $p < .001$). The experimental group attained a mean IQ of 107.4 on the Stanford Binet while the mean for the control group was 86.6

Table 15

A Post Nursery School[1] Comparison between the Experimental (E_4) and Control (C_4) Groups on the Stanford Binet

POST NURSERY								
Measure	Grp.	N	YLTLP	CA (mths)	SBIQ		Diff. bet. Grps.	t
				$\bar{X}$	$\bar{X}$	SD		
Stanford Binet	E_4	23	1	60	107.4	9.9		
	C_4	21	0	58	86.6	9.4	20.8	7.09***

***$p < .001$

[1]After one year of the LTLP

After two years of the Learning to Learn Program (Table 16) the experimental group was 15.1 IQ points ahead of the control group. This was statistically significant at the .001 level. ($t = 4.33$).

Table 16

A Post Kindergarten[1] Comparison between the Experimental (E_4) and Control (C_4) Groups on the Stanford Binet

		POST KINDERGARTEN						
Measure	Grp.	N	YLTLP	CA (mths)	SBIQ		Diff. bet. Grps.	t
				$\bar{X}$	$\bar{X}$	SD		
Stanford Binet	E_4	22	2	70	108.6	13.3		
	C_4	20	0	69	93.5	9.1	15.1	4.33***

***$p < .001$

[1] After two years of the LTLP

Table 17 represents a post first grade comparison between the experimental and control groups on the Stanford Binet. The E_4 group (after three years of the Learning to Learn Program) exhibited a 15.9 IQ point advantage over the C_4 group. This was also statistically significant at the .001 level ($t = 4.15$). After three years in the Learning to Learn Program the E_4 group was functioning at a mean IQ of 107.0 while the control children were at a mean IQ level of 91.1.

Table 17

A Post First Grade[1] Comparison between the Experimental (E_4) and Control (C_4) Groups on the Stanford Binet

		POST FIRST GRADE						
Measure	Grp.	N	YLTLP	CA (mths)	SBIQ		Diff. bet. Grps.	t
				$\bar{X}$	$\bar{X}$	SD		
Stanford Binet	E_4	20	3	82	107.0	11.7		
	C_4	18	0	81	91.1	11.9	15.9	4.15***

***$p < .001$

[1] After three years of the LTLP

A pre-post comparison between the experimental (E_4) and control (C_4) groups on the Stanford Binet taken prior to the beginning of the Learning to Learn Program (1968) and at the end of the third year (post first grade, 1971) is presented in Table 18. The E_4 group's mean IQ gain over the three years in the program was 19.3 IQ points, while the control group gained 3.0 IQ points over the same period of time. Thus with the pre program mean IQ's of the two groups being essentially the same (E_4 = 87.7; C_4 = 88.1), the mean IQ point difference between the two groups after three years in the program is 16.3 points.

Table 18

A Pre Learning to Learn Program to Post First Grade Longitudinal Comparison between the Experimental (E_4) and Control (C_4) Groups on the Stanford Binet

		PRE-LEARNING TO LEARN PROGRAM				POST FIRST GRADE					
Measure	Grp.	N	YLTLP	SBIQ		N	YLTLP	SBIQ		IQ Gain or loss	t
				$\bar{X}$	SD			$\bar{X}$	SD		
Stanford Binet	E_4	23	0	87.7	11.9	20	3	107.0	11.7	19.3	9.38***
	C_4	21	0	88.1	7.0	18	0	91.1	11.9	3.0	0.45

***$p < .001$

Table 19 and Figure 5 presents the E_4 and C_4 Stanford Binet IQ data in a longitudinal form.

After the first year of the Learning to Learn Program the E_4 group exhibited a mean IQ gain of 19.7 points. During that same period of time the C_4 children lost 1.5 IQ points. These results indicate that the E_4 group made nearly all of its gain during the first year and then sustained that gain during the second and third year of the program. The control group remained relatively constant, losing 1.5 IQ points during the first year, gaining 6.9 IQ points during the second year, then losing 2.4 IQ points during the third year.

During the second year the experimental children did not significantly increase their IQ in comparison to the previous year. The E_4 group did, however, maintain a relatively high IQ of 108.6 after two years and 107.0 after three years. Thus over the entire three year Learning to Learn Program the experimental group gained 19.3 IQ points while the control group gained 3.0 points.

Table 19

A Yearly Longitudinal Pre Learning to Learn Program to Post First Grade Comparison[1] between the Experimental (E_4) and Control (C_4) Groups on the Stanford Binet

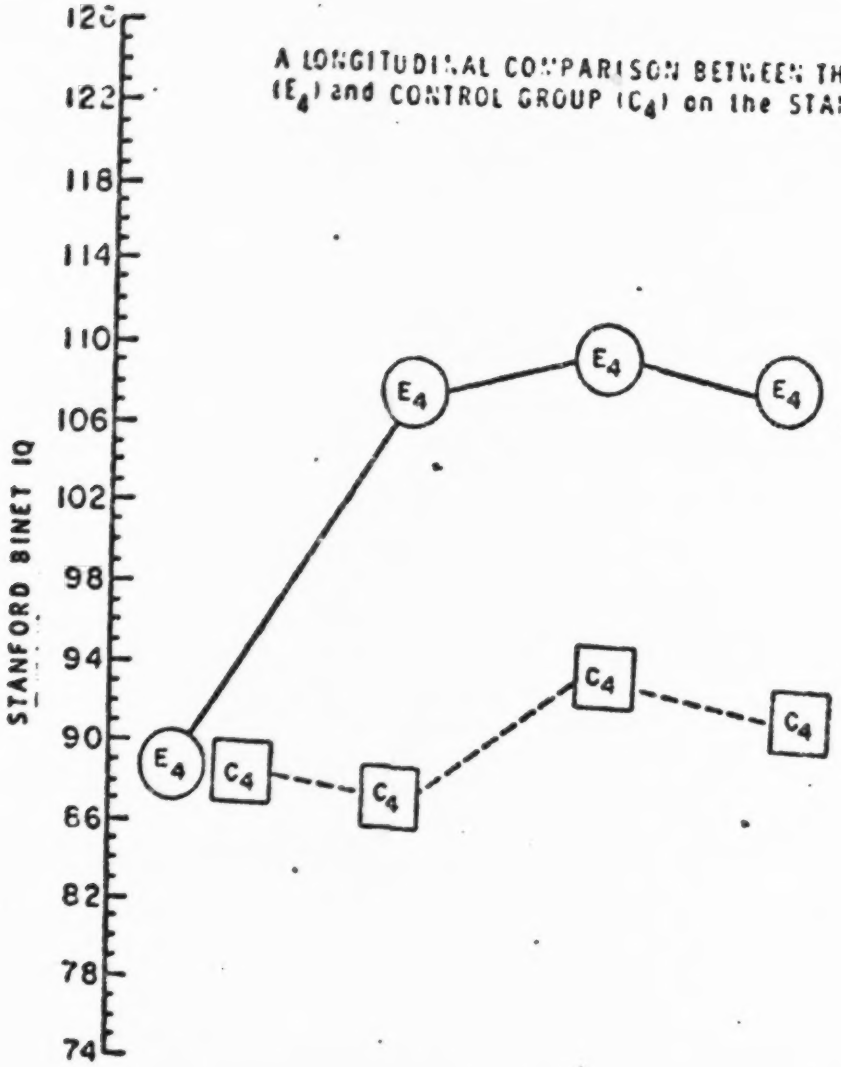
		PRE-LTLP		POST-N		POST-K		POST-1st			
		1968		1969		1970		1971		Pre-LTLP to Post 1st	
Measure	Grp.	SBIQ		SBIQ		SBIQ		SBIQ		SBIQ Gain or (loss)	t
		$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD		
Stanford Binet	E_4	87.7	11.9	107.4	9.9	108.6	13.3	107.0	11.7	19.3	9.38***
	C_4	88.1	7.0	86.6	9.4	93.5	9.1	91.1	11.9	3.0	0.45

***$p < .001$

[1]After three years of the LTLP

FIGURE 5

A LONGITUDINAL COMPARISON BETWEEN THE EXPERIMENTAL (E_4) and CONTROL GROUP (C_4) on the STANFORD BINET



SBIQ Pre-Nursery	SBIQ Post-Nursery	SBIQ Post-Kind	SBIQ Post 1st Grade
E_4 • 88	E_4 • 107	E_4 • 109	E_4 • 107
C_4 • 88	C_4 • 87	C_4 • 93	C_4 • 91

Stanford Binet: Mental Age Comparisons between the Experimental (E_4) and Control (C_4) Groups

In order to look at intellectual growth in terms of change in mental age as well as IQ the Stanford Binet data on the children beginning the program at age 4 were also analyzed on the basis of mental age. The comparisons between the experimental (E_4) and control (C_4) groups on Stanford Binet mental age (SBMA) are shown in Tables 20 through 24.

A pre Learning to Learn Program comparison between the E_4 and C_4 groups on Stanford Binet mental age is presented in Table 20. The results of this analysis indicate that there was no statistically significant difference in Stanford Binet mental age between the two groups prior to the first year of the program.

Table 20

A Pre Learning to Learn Program Comparison between the Experimental (E_4) and Control (C_4) Groups on Stanford Binet Mental Age

		PRE LEARNING TO LEARN PROGRAM						
Measure	Grp.	N	YLTLP	CA (mths)	SBMA (mths)		MA < CA (mths)	t
				$\bar{X}$	$\bar{X}$	SD		
Stanford Binet	E_4	23	0	51	45	7.0	-6	
	C_4	21	0	49	45	5.5	-4	.48

An examination of Table 21 shows that during the first year (pre Learning to Learn Program to post nursery) of the Learning to Learn Program the experimental and control groups had large differential gains in Stanford Binet mental age growth. The experimental group gained 18 Stanford Binet mental age months compared to a 6 month mental age gain for the control children.

After being in the program for one year the E_4 group moved from a mental age of 6 months below their chronological age to being 3 months ahead of their chronological age. The control group who were in a day care setting during the first year moved from 4 mental age months below their chronological age to 7 mental age months below their chronological age. Thus after the first year there was a 12 months mental age difference between the experimental (E_4) and control (C_4) groups.

Table 21

A Pre Learning to Learn Program to Post Nursery[1] Comparison between the Experimental (E_4) and Control (C_4) Groups on Stanford Binet Mental Age

		PRE-LEARNING TO LEARN PROGRAM				POST NURSERY						
Measure	Grp.	N	YLTLP	CA (mths) $\bar{X}$	SBMA (mths) $\bar{X}$	N	YLTLP	CA (mths) $\bar{X}$	SBMA (mths) $\bar{X}$	MA Gain (mths)	MA>CA (mths)	t
Stanford Binet	E_4	23	0	51	45	23	1	60	63	18	+3	14.1***
	C_4	21	0	49	45	21	0	58	51	6	-7	6.0***

***$p < .001$

[1]After one year in the LTLP

During the second year of the project (Table 22) the E_4 and C_4 groups both gained 13 Stanford Binet mental age months. After two years in the Learning to Learn Program the experimental children obtained a Stanford Binet mental age that was 5 months greater than their chronological age while the control children achieved a mental age that was 5 months less than their chronological age. There remained a difference of 12 mental age months between the experimental and control children.

Table 22

A Post Nursery to Post Kindergarten[1] Comparison between the Experimental (E_4) and Control (C_4) Groups on Stanford Binet Mental Age

		POST NURSERY				POST KINDERGARTEN						
Measure	Grp.	N	YLTLP	CA (mths) $\bar{X}$	SBMA (mths) $\bar{X}$	N	YLTLP	CA (mths) $\bar{X}$	SBMA (mths) $\bar{X}$	MA Gain (mths)	MA>CA (mths)	t
Stanford Binet	E_4	23	1	60	63	22	2	71	76	13	+5	8.2***
	C_4	21	0	58	51	20	0	69	64	13	-5	11.4***

***$p < .001$

[1]After two years in the LTLP

Table 23 shows that during the first grade school year (the third year of the Learning to Learn Program) the experimental and control groups gained approximately the same number of Stanford Binet mental age months (E_4 = 12; C_4 = 11). After three years in the Learning to Learn Program the E_4 group had a mental age of 6 months above their chronological age, while their C_4 children had a mental age 6 months less than their chronological age.

Table 23

A Post Kindergarten to Post First Grade[1] Comparison between the Experimental (E_4) and Control (C_4) Groups on Stanford Binet Mental Age

		POST KINDERGARTEN				POST FIRST GRADE						
Measure	Grp.	N	YLTLP	CA (mths) $\bar{X}$	SBMA (mths) $\bar{X}$	N	YLTLP	CA (mths) $\bar{X}$	SBMA (mths) $\bar{X}$	MA Gain (mths)	MA $\gtrless$ CA (mths)	t
Stanford Binet	E_4	22	2	71	76	20	3	82	88	12	+6	8.8***
	C_4	20	0	69	64	18	0	81	75	11	-6	6.9***

***p $<$ .001

[1]After three years of the LTLP

Table 24 shows a pre program to post first grade comparison on mental age gain. After three years of the Learning to Learn Program the experimental group had gained 43 Stanford Binet mental age months compared to a 30 month gain for the control group.

Table 24

A Pre Learning to Learn Program to Post First Grade Longitudinal Comparison between the Experimental (E_4) and Control (C_4) Groups on Stanford Binet Mental Age

		PRE-LEARNING TO LEARN PROGRAM				POST FIRST GRADE						
Measure	Grp.	N	YLTLP	CA (mths) $\bar{X}$	SBMA (mths) $\bar{X}$	N	YLTLP	CA (mths) $\bar{X}$	SBMA (mths) $\bar{X}$	MA Gain (mths)	MA $\gtrless$ CA (mths)	t
Stanford Binet	E_4	23	0	51	45	20	3	82	88	43	+6	32.3***
	C_4	21	0	49	45	18	0	81	75	30	-6	14.6***

***p $<$ .001

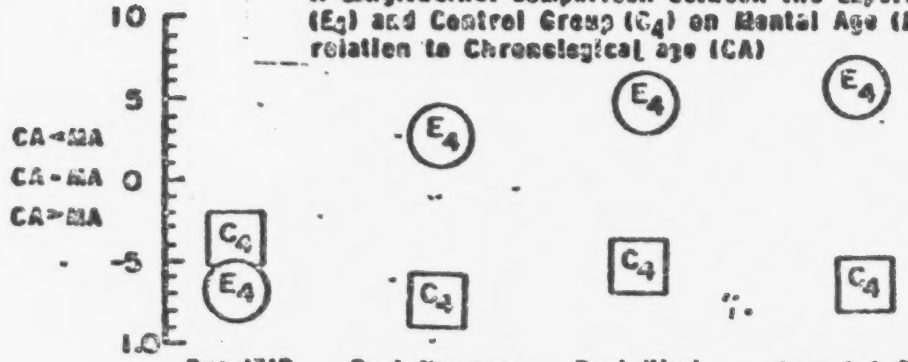
A longitudinal descriptive comparison between the E_4 and C_4 groups on mental age gain and the relationship between their chronological age and mental age is presented in Figure 6.

The E_4 group's mental age moved from 6 months below their chronological age (prior to the Learning to Learn Program) to a mental age 6 months above their chronological age after three years in the Learning to Learn Program. This pattern was not evident for their control group. The C_4 group's mental age after three years of educative process was six mental age months below their own chronological age.

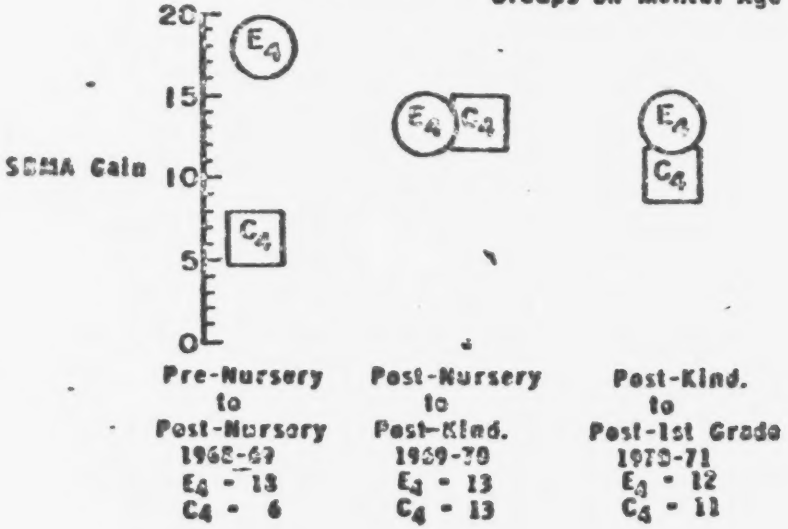
Figure 6 shows clearly that it was during the first year of the Learning to Learn Program that the experimental children obtained their greatest mental age growth. During the following two years their gains in mental age were quite similar to the control children.

Figure 6

A longitudinal comparison between the Experimental (E_4) and Control Group (C_4) on Mental Age (MA) in relation to Chronological age (CA)



A Comparison between the Experimental (E_4) and Control (C_4) Groups on Mental Age Gain



Stanford Binet: Intelligence Quotient Comparisons between the Experimental (E_4, E_5) Groups and between the Control (C_4, C_5) Groups.

Table 25 presents a comparison between the two experimental groups (E_4 vs. E_5) and between the two control groups (C_4 vs. C_5) at age five. This analysis was performed to examine the effects of one year of the Learning to Learn Program on the experimental (E_4) group as compared to the (E_5) group who had not yet participated in the experimental program. The effects of day care on the C_4 group as compared to the C_5 group who did not have any treatment was also studied. Results of this comparison indicate that the experimental (E_4) group's mean IQ of 107.4 was 17.7 points higher than the E_5 group's mean of 89.7 after one year of the Learning to Learn Program for the E_4 group. ($t = 5.70$; $p < .001$) The comparison of the control (C_4 and C_5) groups at age five was undertaken to examine whether a difference in intellectual performance existed between the control groups since the C_4 children had participated in day care while the C_5 controls had not yet started Title I kindergarten. The C_4 and C_5 groups at age five showed relatively little difference in intellectual performance. The mean IQ for the C_4 group was 86.6 while the C_5 mean IQ was 89.6. After one year in day care for the C_4 group and no formal program for the C_5 group, there was no statistically or educationally significant differences in their intellectual performance.

Table 25

A Comparison between the Experimental (E_4 & E_5) Groups and between the Control (C_4 & C_5) Groups at Chronological Age Five on the Stanford Binet

Measure	Grp.	N	YLTLP	Ed. Status	CA (mths)	SBIQ $\bar{X}$	SBIQ SD	Diff. bet. Grps.	t
Stanford Binet	E_4	23	1	Post-N	60	107.4	9.9		
	E_5	21	0	Pre-K	62	89.7	9.5	17.7	5.70***
	C_4	21	0	Post-N	58	86.6	9.4		
	C_5	21	0	Pre-K	62	89.6	8.2	3.0	-1.27

***$p < .001$

When comparing the E_4 and E_5 groups at the end of kindergarten, on the Stanford Binet, (Table 26) the E_4 group with a mean IQ of 108.6 scored significantly higher than the E_5 group whose mean was 98.8. ($t = 2.60$, $p < .01$) After the kindergarten school year there is a mean IQ difference of 9.8 IQ points between the two experimental groups. When comparing the control groups after kindergarten the C_4 group exhibited a greater mean IQ (93.5) than the C_5 group (88.0). At the end of kindergarten there was a 5.5 IQ point difference on the Stanford Binet between the two control groups; however, this IQ difference was not statistically significant.

Table 26

A Post Kindergarten Comparison between the Experimental (E_4 vs. E_5) Groups and between the Control (C_4 vs. C_5) Groups on the Stanford Binet

POST KINDERGARTEN								
Measure	Grp.	N	YLTLP	CA (mths)	SBIQ		Diff. bet. Grps.	t
					$\bar{X}$	SD		
Stanford Binet	E_4	22	2	70	108.6	13.3		
	E_5	21	1	71	98.8	11.2	9.8	2.60**
	C_4	20	0	69	93.5	9.1		
	C_5	21	0	70	88.0	12.6	5.5	1.72

**p < .01

Table 27 presents a post first grade comparison between the two experimental groups and between the two control groups on the Stanford Binet. At the end of first grade both of the experimental groups have essentially the same Stanford Binet IQ (E_4 = 107.0; E_5 = 106.2). It should be pointed out, however, that even though the means of the two groups are essentially the same the standard deviations are quite different. The E_4 group has a standard deviation of 11.7 while the E_5 group has a standard deviation of 17.7. This indicates a closer distribution of scores around the mean of 107.0 for the E_4 group. When comparing the two control groups after first grade the C_4 group scored higher than the C_5 group. There is a 4.9 IQ difference between these two groups. This difference did not reach statistical significance.

Table 27

A Post First Grade Comparison between the Experimental (E_4 & E_5) Groups and between the Control (C_4 & C_5) Groups on the Stanford Binet

POST FIRST GRADE								
Measure	Grp.	N	YLTLP	CA (mths)	SBIQ		Diff. bet. Grps.	t
					$\bar{X}$	SD		
Stanford Binet	E_4	20	3	82	107.0	11.7		
	E_5	17	2	83	106.2	17.7	.8	.16
	C_4	18	0	81	91.1	11.9		
	C_5	20	0	81	86.2	9.6	4.9	1.41

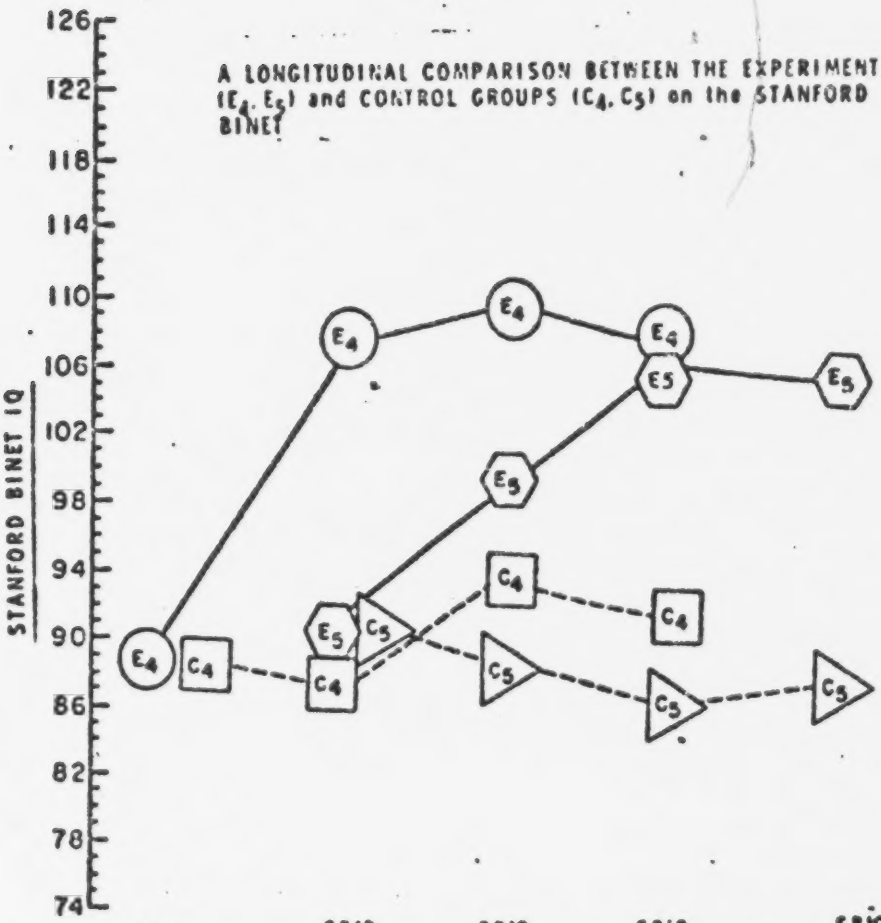
Figure 7 represents a longitudinal comparison between the experimental (E_4 & E_5) and control (C_4 & C_5) groups on the Stanford Binet.

It is quite apparent that the two experimental groups exhibit different Stanford Binet IQ trends as a result of their participation in the Learning to Learn Program. The E_4 group made a dramatic gain after their first year in the Learning to Learn Program and then maintained their intellectual functioning for the duration of the Learning to Learn Program. The E_5 group's Stanford Binet intellectual pattern is one of approximately equal intellectual growth after each of their years in the Learning to Learn Program. It is important to note that both the experimental groups after first grade have very similar SBIQ (E_5, 106; E_4, 107).

The patterns of the two control groups over time appear to be quite similar. Their intellectual functioning during their preschool and early elementary school years ranges in the low 90's to the high 80's.

FIGURE 7

A LONGITUDINAL COMPARISON BETWEEN THE EXPERIMENTAL (E_4, E_5) and CONTROL GROUPS (C_4, C_5) on the STANFORD BINET



SBIQ Pre-Nursery	SBIQ Post-Nursery	SBIQ Post-Kind.	SBIQ Post-1st Grade	SBIQ Post 2nd Grade (1yr. after termination of LTLP)
E_4 = 88	E_4 = 107	E_4 = 109	E_4 = 107	
C_4 = 88	C_4 = 87	C_4 = 93	C_4 = 91	
	E_5 = 90	E_5 = 99	E_5 = 106	E_5 = 105
	C_5 = 90	C_5 = 88	C_5 = 86	C_5 = 87

Stanford Binet: Mental Age Comparisons between the Experimental (E_4, E_5) Groups and between the Control (C_4, C_5) Groups.

Table 28 and Figure 8 are longitudinal descriptive comparisons between the experimental groups (E_4 vs E_5) and between the control groups (C_4 vs C_5) on Stanford Binet mental age gain. The two experimental groups show differential mental age gain patterns over time. The major difference in mental age gain occurs during the first year for the E_4 group when they gained 18 mental age months. The E_5 group who started the Learning to Learn Program at age five gained only 14 Stanford Binet mental age months during their first year. The E_4 group maintained a relatively consistent mental age gain during the second and third years with gains of 13 months in the second year and 12 months during the third.

The E_5 group makes their largest gain in Stanford Binet mental age months during the second year of the Learning to Learn Program while they are in first grade. During the year following termination of the Learning to Learn Program the mental age gain for the E_5 group was 12 months.

The C_4 control group who attended day care and then Title I kindergarten, gained 6 months during their day care experience and 13 months during their Title I kindergarten experience. The C_5 controls who only attended Title I kindergarten gained 6 mental age months during that period, and then gained 9 mental age months during first grade. During the second grade they gained 12 mental age months.

It is important to note that there appears to be a differential pattern of mental age gain between the experimental groups based upon the time they started the Learning to Learn Program. The experimental (E_4) group made their largest gain during the first year of the program and maintained a relatively constant Stanford Binet mental age gain throughout the duration of the program. The pattern for the E_5 group is somewhat different. During the first year they made a smaller gain than the E_4 children. However, during the second year of the program they continued to gain in mental age months until their level of intellectual functioning approximated that of the E_4 group; then during the third year they too showed a pattern of maintaining a constant mental age gain (12 mental age months per calendar year).

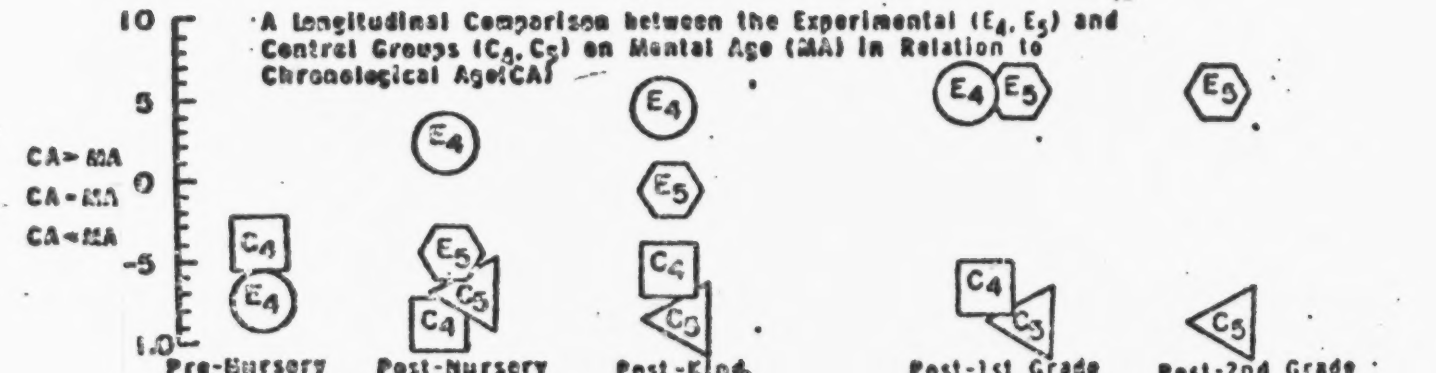
Table 28

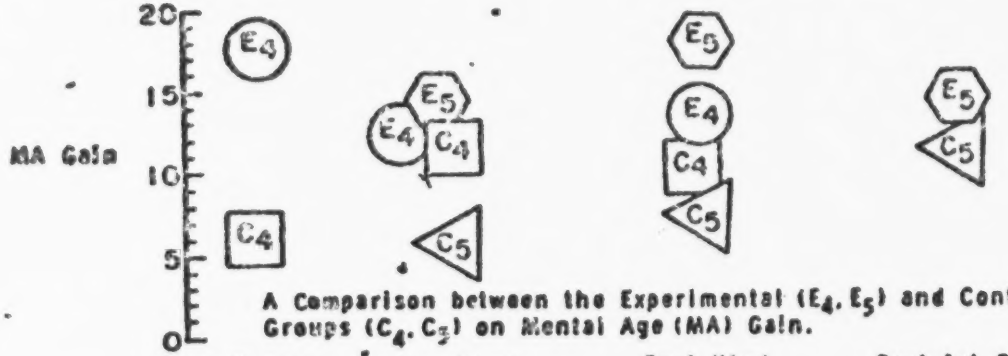
A Longitudinal Comparison between the Experimental (E_4 vs E_5) Groups and between the Control (C_4 vs C_5) Groups on Stanford Binet Mental Age Gain

Measure	Grp.	Ed. Status	N	YLTLP	YATLTLP	SBMA (mths)	SBMA Gain (mths)
Stanford Binet							
CA-4	E_4	Pre-LTLP	23	0		45	
	E_5						
	C_4	Pre-N	21	0		45	
	C_5						
CA-5	E_4	Post-N	23	1		63	18
	E_5	Pre-LTLP	21	0		57	
	C_4	Post-N	21	0		51	6
	C_5	Pre-K	21	0		56	
CA-6	E_4	Post-K	22	2		76	13
	E_5	Post-K	21	1		71	14
	C_4	Post-K	20	0		64	13
	C_5	Post-K	21	0		62	6
CA-7	E_4	Post-1st	20	3		88	12
	E_5	Post-1st	17	2		88	17
	C_4	Post-1st	18	0		75	11
	C_5	Post-1st	20	0		71	9
CA-8	E_4						
	E_5	Post-2nd	16	2	1	100	12
	C_4						
	C_5	Post-2nd	20	0	NA	83	12

Figure 8

A Longitudinal Comparison between the Experimental (E_4, E_5) and Control Groups (C_4, C_5) on Mental Age (MA) in Relation to Chronological Age(CA)





A Comparison between the Experimental (E_4, E_5) and Control Groups (C_4, C_5) on Mental Age (MA) Gain.

Wechsler Intelligence Scale for Children, Verbal Intelligence Quotient (WISC - VIQ)

Comparisons between the experimental (E_5) and control (C_5) groups on the WISC Verbal Scale are presented in Table 29. The experimental (E_5) group, after attending the Learning to Learn Program for two years and public school for one year, exhibit a significantly higher WISC VIQ than the control group. The E_5's level of functioning on the WISC VIQ at the end of the second grade is 103.2 while the C_5 group has a WISC VIQ of 88.1. This is statistically significant at the .001 level. After second grade there is a 15.1 point WISC VIQ difference between the two groups.

Table 29

A Post Second Grade Comparison[1] between the Experimental (E_5) and Control (C_5) Groups on the WISC Verbal Scale

		POST SECOND GRADE						
Measure	Grp.	N	YLTLP	YATLTLP	WISC VIQ		Diff. bet. Grps.	t
					$\bar{X}$	SD		
WISC Verbal Scale	E_5	16	2	1	103.2	13.2		
	C_5	20	0	NA	88.1	6.2	15.1	4.56***

***$p < .001$

[1]One year after termination of the LTLP

A post first grade comparison between the experimental (E_4) and control (C_4) groups on the WISC VIQ is presented in Table 30. At the end of three years of the Learning to Learn Program the experimental (E_4) group attains a WISC VIQ of 102.3, while their control (C_4) group scores a mean of 90.3. By the end of first grade there is a 12.0 WISC VIQ point difference between the two groups. This is also significant at the .001 level. ($t = 4.36$).

Table 30

A Post First Grade[1] Comparison between the Experimental (E_4) and Control (C_4) Groups on the WISC Verbal Scale

		POST FIRST GRADE					
Measure	Grp.	N	YLTLP	WISC VIQ		Diff. bet. Grps.	t
				$\bar{X}$	SD		
WISC Verbal Scales	E_4	20	3	102.3	7.6		
	C_4	17	0	90.3	9.1	12.0	4.36***

***p $<$ .001

[1]After three years of the LTLP

Figure 9 represents a descriptive longitudinal comparison between the experimental (E_4, E_5) and control groups (C_4, C_5) on the Stanford Binet (pre-test) and the WISC-VIQ (post-test).

The E_4 and E_5 groups both attained a WISC-VIQ of about 103 (after two and three years in the Learning to Learn Program). The control groups (C_4 and C_5) attained a WISC-VIQ of 88 and 90 respectively.

A longitudinal comparison between the E_5 and C_5 groups on the Stanford Binet (pre-kindergarten) and the Primary Mental Abilities II Deviation IQ (post 2nd grade) is presented in Figure 10.

One year after termination of the Learning to Learn Program the E_5 group has a PMA II Deviation IQ of 98 while their control group has a PMA II Deviation IQ of 76. Thus, after second grade there is a 22 point difference between the E_5 and C_5 groups on the Deviation IQ of the PMA II.

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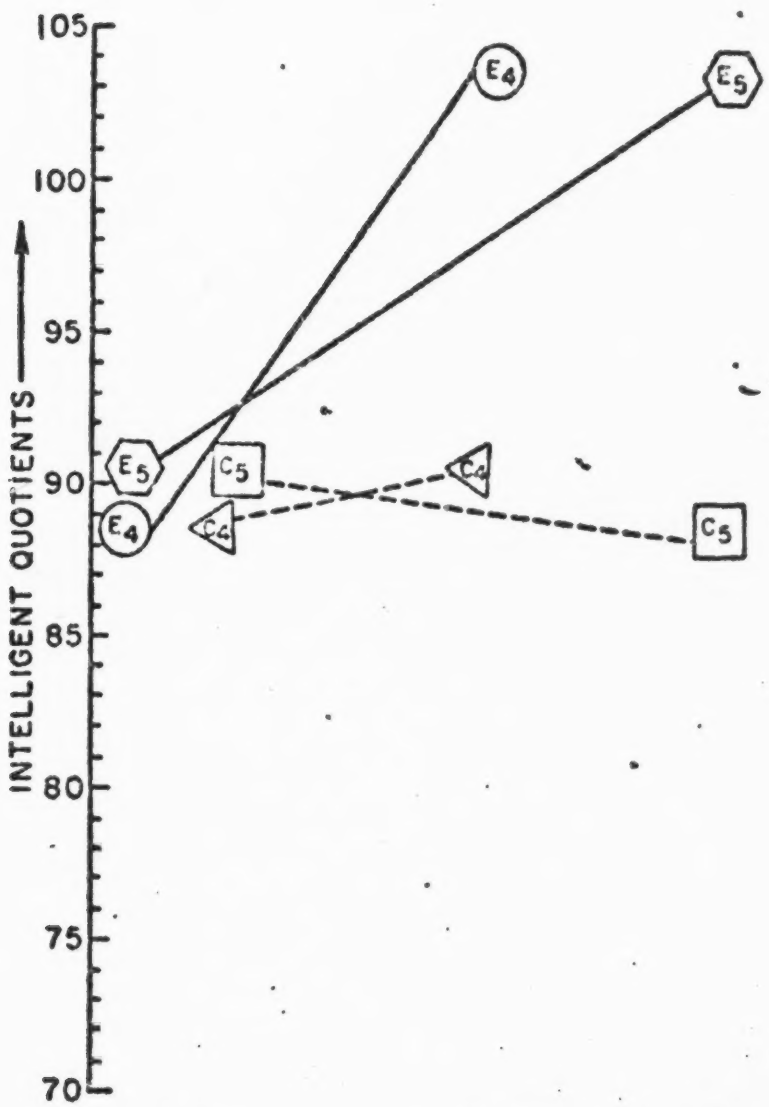
FIGURE 9 51

A LONGITUDINAL COMPARISON BETWEEN THE EXPERIMENTAL (E_4, E_5) and CONTROL GROUPS (C_4, C_5) GROUPS ON THE STANFORD BINET (Pre-Test) and THE WISC-VIQ (Post-Test)



SBIQ	WISC VIQ	WISC VIQ
POST-NURSERY	POST 1st GRADE	POST 2nd GRADE
E_4=88	E_4=103	E_5=103
C_4=88	C_4=90	C_5=88
PRE-KINDERGARTEN		
E_5=90		(ONE YEAR AFTER TERMINATION OF LTLP)
C_5=90		

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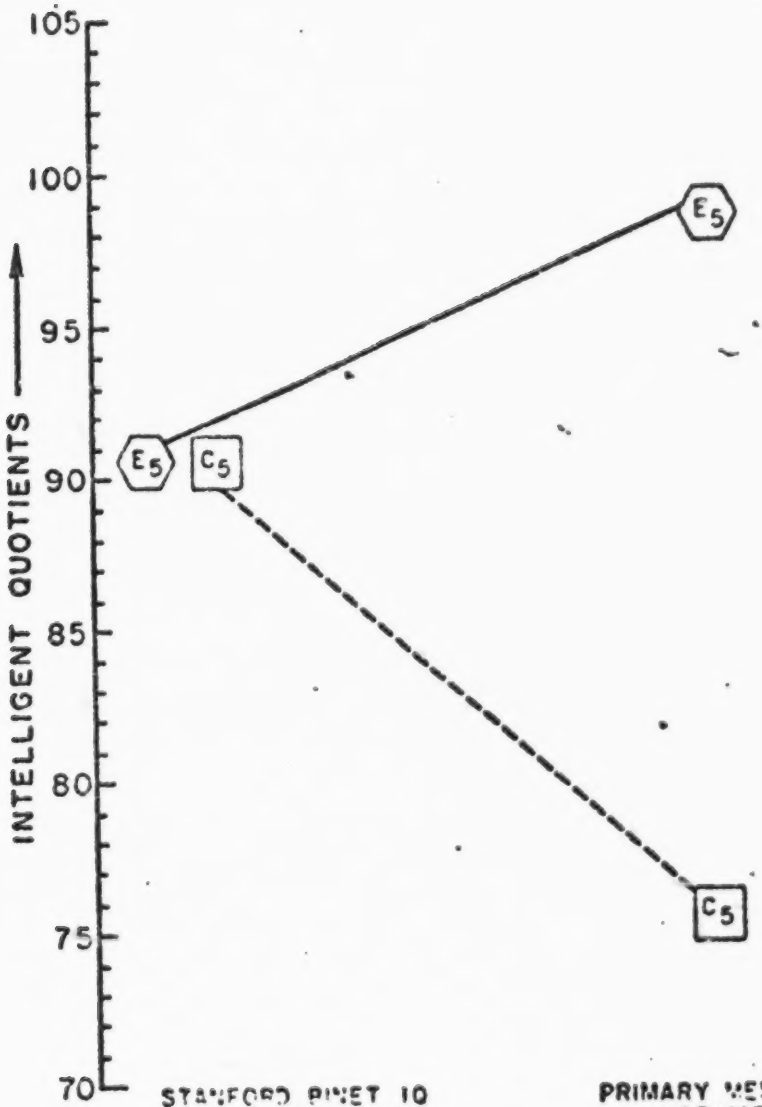
FIGURE 10 52

A LONGITUDINAL COMPARISON BETWEEN THE EXPERIMENTAL (E_5) AND CONTROL (C_5) GROUPS ON THE STANFORD BINET (PRE-KINDERGARTEN) AND THE PRIMARY MENTAL ABILITIES (POST 2nd GRADE)



STANFORD BINET IQ
PRE-KINDERGARTEN
1968
E_5 = 90
C_5 = 90

PRIMARY MENTAL ABILITIES
DEVIATION IQ
POST 2nd GRADE
1971
(ONE YEAR AFTER
TERMINATION OF LTLP)
E_5 = 98
C_5 = 76

Achievement

School Readiness Screening Test

A post kindergarten comparison between the E_4 and C_4 groups and between the E_5 and C_5 groups on the School Readiness Screening Test is presented in Table 31. The E_4 group's mean score of 21.5 is significantly better than the C_4 group's mean score of 16.1 (t = 4.09, $p < .001$). The comparison between the E_5 and C_5 groups reveals similar findings with the E_5 group's mean score of 19.2 being significantly greater (t = 2.22, $p < .05$) than the C_5 group's score of 16.1.

Table 31

A Post Kindergarten Comparison between the Experimental (E_4 and E_5) and Control (C_4 & C_5) Groups on the School Readiness Screening Test

			POST KINDERGARTEN				
Measure	Grp.	N	YLTLP	SRST		Diff. bet. Grps.	t
				$\bar{X}$	SD		
SRST	E_4	22	2	21.5	4.1		
	C_4	20	0	16.1	4.3	5.4	4.09***
	E_5	21	1	19.2	4.7		
	C_5	21	0	16.1	4.3	3.1	2.22*

*$p < .01$ ***$p < .001$

Table 32 represents a post kindergarten comparison between the E_4 and E_5 groups and between the C_4 and C_5 groups at approximately age 6. The E_4 group scores 2.3 points higher on the SRST than the E_5 group which is significant at the .05 level (t = 1.74). When comparing the control groups (C_4 & C_5) on the SRST their scores are very similar. There is almost no difference between these groups at age 6 (t = .04), prior to their entrance into first grade.

Table 32

A Post Kindergarten Comparison between the Experimental (E_4 vs E_5) and Control (C_4 vs C_5) Group on the School Readiness Screening Test

		POST KINDERGARTEN					
Measure	Grp.	N	YLTLP	SRST		Diff. bet. Grps.	t
				$\bar{X}$	SD		
SRST	E_4	22	2	21.5	4.1		
	E_5	21	1	19.2	4.7	2.3	1.74*
	C_4	20	0	16.1	4.3		
	C_5	21	0	16.1	4.3	0.0	0.04

*$p < .05$

Metropolitan Readiness Test

A beginning first grade comparison between the E_5 and C_5 groups on the Metropolitan Readiness test is displayed in Table 33. The E_5 group performed significantly better on all subtests of the Metropolitan Readiness Test than their controls. On the Word Meaning subtest the difference was significant at the .05 level whereas differences on the other subtests were significant beyond the .001 level. When comparing the E_5 and C_5 groups on Metropolitan total raw scores the E_5 group surpassed the C_5 by 27.3 raw score points, which is significant at the .001 level, ($t = 7.01$).

Table 33

A Beginning First Grade Comparison between the Experimental (E_5) and Control (C_5) Groups on the Metropolitan Readiness Test

Measure	Grp.	N	YLTLP	MRT Subtests Raw Scores		Diff. bet. Grps.	t
				$\bar{X}$	SD		
		BEGINNING FIRST GRADE					
MRT							
Word Meaning	E_5	17	1	6.8	1.9		
	C_5	20	0	5.5	2.0	1.3	2.07*
Listening	E_5	17	1	11.5	1.6		
	C_5	20	0	7.5	2.8	4.0	5.46***
Matching	E_5	17	1	8.7	2.2		
	C_5	20	0	5.8	3.6	2.9	3.02***
Alphabet	E_5	17	1	15.6	1.0		
	C_5	20	0	6.3	4.1	9.3	9.72***
Numbers	E_5	17	1	14.7	4.1		
	C_5	20	0	8.0	3.0	6.7	5.59***
Copying	E_5	17	1	7.4	2.2		
	C_5	20	0	3.9	4.2	3.5	3.23***
Total	E_5	17	1	64.0	8.8		
	C_5	20	0	36.7	14.6	27.3	7.01***

*$p < .05$ ***$p < .001$

Table 34 presents the beginning first grade comparison between the experimental (E_4) and control (C_4) groups on the Metropolitan Readiness Test. The E_4 group scored significantly higher than the C_4 group on all subtests of the Metropolitan. When comparing the experimental and control groups on the Metropolitan Total Raw Scores the E_4 children surpassed their controls by 34.5 raw score points which is significant beyond the .001 level ($t = 8.85$).

Table 34

A Beginning First Grade Comparison between the Experimental (E_4) and Control (C_4) Groups on the Metropolitan Readiness Test

BEGINNING FIRST GRADE							
Measure	Grp.	N	YLTLP	MRT Subtests Raw Scores		Diff. bet. Grps.	t
				$\bar{X}$	SD		
MRT							
Word Meaning	E_4	22	2	7.7	1.8		
	C_4	14	0	4.4	2.1	3.3	5.10***
Listening	E_4	22	2	11.0	2.2		
	C_4	14	0	6.9	2.1	4.1	5.50***
Matching	E_4	22	2	10.2	2.6		
	C_4	14	0	5.2	4.3	5.0	4.38***
Alphabet	E_4	22	2	15.8	0.4		
	C_4	14	0	7.6	5.0	8.2	7.71***
Numbers	E_4	22	2	16.0	2.3		
	C_4	14	0	7.9	3.2	8.1	8.73***
Copying	E_4	22	2	9.9	2.2		
	C_4	14	0	3.9	3.5	6.0	6.33***
Total	E_4	22	2	70.6	6.9		
	C_4	14	0	36.1	16.2	34.5	8.85***

***$p < .001$

A beginning first grade comparison between the experimental (E_4 vs E_5) and control (C_4 vs C_5) groups on the Metropolitan Readiness Test is presented in Table 35. When comparing the E_4 and E_5 groups on the MRT the E_4 children did better than the E_5 children on five out of the six subtests. Two of these differences reach significance, namely the Matching ($t = 1.96$, $p < .05$) and Copying ($t = 3.61$, $p < .001$) subtests. When taking the total raw scores and comparing the two experimental groups the E_4 group is statistically superior to the E_5 group. ($t = 2.64$, $p < .05$). The same comparisons between the control groups indicate that there is no appreciable difference between their scores on the various subtests of the MRT. In terms of total scores on the MRT the two control groups perform very similarly with the C_4's receiving a raw score of 36.1 and the C_5's 36.7.

Table 35

A Beginning First Grade Comparison between the Experimental (E_4 vs E_5) and Control (C_4 vs C_5) Groups on the Metropolitan Readiness Test

BEGINNING FIRST GRADE							
Measure	Grp.	N	YLTLP	MRT Subtests Raw Scores		Diff. bet. Grps.	t
				$\bar{X}$	SD		
MRT							
Word Meaning	E_4	22	2	7.7	1.8		
	E_5	17	1	6.8	1.9	.9	1.51
	C_4	14	0	4.4	2.1		
	C_5	20	0	5.5	2.0	1.1	-1.46
Listening	E_4	22	2	11.0	2.2		
	E_5	17	1	11.5	1.6	.5	-0.81
	C_4	14	0	6.9	2.1		
	C_5	20	0	7.5	2.3	.6	-0.60
Matching	E_4	22	2	10.2	2.6		
	E_5	17	1	8.7	2.2	1.5	1.96*
	C_4	14	0	5.2	4.3		
	C_5	20	0	5.8	3.6	.6	-0.43
Alphabet	E_4	22	2	15.8	.4		
	E_5	17	1	15.6	1.0	.2	0.78
	C_4	14	0	7.6	5.0		
	C_5	20	0	6.3	4.1	1.3	0.86
Numbers	E_4	22	2	16.0	2.3		
	E_5	17	1	14.7	4.1	1.3	1.24
	C_4	14	0	7.9	3.2		
	C_5	20	0	8.0	3.0	.1	-0.07
Copying	E_4	22	2	9.9	2.2		
	E_5	17	1	7.4	2.2	2.5	3.61***
	C_4	14	0	3.9	3.5		
	C_5	20	0	3.9	4.2	.0	-0.03
Total	E_4	22	2	70.6	6.9		
	E_5	17	1	64.0	8.8	6.6	2.64*
	C_4	14	0	36.1	16.2		
	C_5	20	0	36.7	14.6	.6	-0.11

*p < .05 ***p < .001

Primary Mental Abilities Test

A post first grade comparison between the E_5 and C_5 groups on the Primary Mental Abilities I is presented in Table 36. The results indicate that the scores of the E_5 group are significantly higher on all of the subtests and that these differences are of practical significance as well. The mean MA difference between the E_5 and C_5 groups on the subtests of the PMA ranges from 6 MA months to 11 MA months. When comparing the "Total Score" between the two groups ($t = 2.95$, $p \leq .01$), it is important to point out that the E_5 group's MA is 3 months below their CA while the C_5 group's MA is 9 months below their CA. The highest performance for both groups is in the area of perceptual speed where the E_5 children's score is 11 MA months above the C_5's.

Table 36

A Post First Grade[1] Comparison between the Experimental (E_5) and Control (C_5) Groups on the Primary Mental Abilities I

		POST FIRST GRADE						
Measure	Grp.	N	YLTLP	CA (mths)	PMA I MA (mths)		Diff. bet. Grps.	t
				$\bar{X}$	$\bar{X}$	SD		
PMA I								
Verbal Meaning	E_5	17	2	83	75	7.6		
	C_5	20	0	81	69	8.5	6	2.09*
Perceptual Speed	E_5	17	2	83	91	9.5		
	C_5	20	0	81	80	10.1	11	3.64***
Number Facility	E_5	17	2	83	84	8.8		
	C_5	20	0	81	75	11.8	9	2.80**
Spatial Relations	E_5	17	2	83	76	8.6		
	C_5	20	0	81	70	12.6	6	1.79*
Total	E_5	17	2	83	80	6.5		
	C_5	20	0	81	72	9.3	8	2.95**

*$p < .05$ **$p < .01$ ***$p < .001$

[1] After 2 years of the LTLP

Table 37 presents a post second grade comparison between the experimental (E_5) and control (C_5) groups on the Primary Mental Abilities II. On all four subtests of the PMA, the experimental group scored higher than their controls. The differences between the two groups range from 4 mental age months on Spatial Relations to 13 mental age months on Number Facility. Three of the four subtests (Verbal Meaning, Percpetual Speed, and Number Facility) reached significance

(VM, $\underline{t}$ = 3.91, p .001; PS, $\underline{t}$ = 1.91, p .05; NF, $\underline{t}$ = 3.96, p .001). Thus one year after termination of the Learning to Learn Program the experimental group has an average of 9 month mental age superiority on the PMA to their controls.

Table 37

A Post Second Grade[1] Comparison between the Experimental (E_5) and Control (C_5) Groups on the Primary Mental Abilities II

POST SECOND GRADE									
Measure	Grp.	N	YLTLP	YATLTLP	CA (mths)	PMA II MA (mths)		Diff. bet. Grps.	$\underline{t}$
					$\bar{X}$	$\bar{X}$	SD		
PMA II									
Verbal Meaning	E_5	15	2	1	94	93	7.9		
	C_5	20	0	NA	93	83	7.5	10	3.91***
Perceptual Speed	E_5	15	2	1	94	101	11.7		
	C_5	20	0	NA	93	91	16.2	10	1.91*
Number Facility	E_5	15	2	1	94	98	8.3		
	C_5	20	0	NA	93	85	10.4	13	3.96***
Spatial Relations	E_5	15	2	1	94	100	10.1		
	C_5	20	0	NA	93	96	12.7	4	1.13

*p < .05 ***p < .001

[1] One Year after termination of the LTLP

Post first grade comparisons between the E_4 and C_4 groups on the PMA I are presented in Table 38. The E_4 group after three years in the Learning to Learn Program out performed their controls on each subtest in the PMA. The mental age differences between the two groups ranged from 1 to 10 MA months. The differences on four out of the five subtests of the PMA reached statistical significance in favor of the E_4 group.

Table 38

A Post First Grade[1] Comparison between the Experimental (E_4) and Control (C_4) Groups on the Primary Mental Abilities I

		POST FIRST GRADE						
Measure	Grp.	N	YLTLP	CA (mths)	PMA I MA (mths)		Diff. bet. Grps.	t
				$\bar{X}$	$\bar{X}$	SD		
PMA I								
Verbal	E_4	20	3	82	78	6.9		
Meaning	C_4	18	0	81	68	7.9	10	4.19***
Perceptual	E_4	20	3	82	85	13.1		
Speed	C_4	18	0	81	84	14.3	1	0.14
Number	E_4	20	3	82	84	7.3		
Facility	C_4	18	0	81	75	9.3	9	3.28**
Spatial	E_4	20	3	82	78	6.4		
Relations	C_4	18	0	81	69	11.2	9	3.06**
Total	E_4	20	3	82	81	6.1		
Subtests	C_4	18	0	81	73	7.2	8	3.71***

**$p < .01$ ***$p < .001$

[1] After three years of the LTLP

Post first grade comparisons between the experimental (E_4 vs E_5) and between the control (C_4 vs C_5) groups on the PMA I are presented in Table 39. There was no statistical difference between the experimental groups or control groups on any subtest of the PMA I.

Table 39

A Post First Grade Comparison between the Experimental (E_4 vs E_5) and between the Control (C_4 vs C_5) Groups on the Primary Mental Abilities Test I

				POST FIRST GRADE						
					PMA I					
Measure	Grp.	N	YLTLP	CA (mths)	MA (mths)		Diff. bet. Grps.		MA ? CA	t
				$\bar{X}$	$\bar{X}$	SD	E_4vsE_5	C_4vsC_5	E_4vsE_5	C_4vsC_5	
PMA I											
Verbal	E_4	20	3	82	78	6.9			-4		
Meaning	E_5	17	2	83	75	7.6	3		-8		1.44
	C_4	18	0	81	68	7.9				-13	
	C_5	20	0	81	69	8.5		1		-12	-0.42
Perceptual	E_4	20	3	82	85	13.1			+3		
Speed	E_5	17	2	83	91	9.5	6		+8		-1.78
	C_4	18	0	81	84	14.3				+ 3	
	C_5	20	0	81	80	10.1		4		- 1	1.10
Number	E_4	20	3	82	84	7.3			+2		
Facility	E_5	17	2	83	84	8.8	0		+1		-0.13
	C_4	18	0	81	75	9.3				- 6	
	C_5	20	0	81	75	11.8		0		- 6	0.15
Spatial	E_4	20	3	82	78	6.4			-4		
Relations	E_5	17	2	83	76	8.6	2		-7		0.79
	C_4	18	0	81	69	11.2				-12	
	C_5	20	0	81	70	12.6		1		-11	-0.15
Total	E_4	20	3	82	81	6.1			-1		
Subtests	E_5	17	2	83	80	6.5	1		-3		0.18
	C_4	18	0	81	73	7.2				- 8	
	C_5	20	0	81	72	9.3		1		- 9	0.09

Stanford Achievement Test

Table 40 presents the results of a post first grade comparison between the E_5 and C_5 groups on the Stanford Achievement Test. The E_5 group scored significantly above the control group on four out of the six subtests of the SAT I. The t's ranged from 2.38 ($p < .05$) on the Paragraph Meaning subtest to t's of 5.72 and 6.22 ($p < .001$) on the Arithmetic and Spelling subtests. The highest performance for the experimental children was on the Spelling and Arithmetic subtests where their grade scores were one year ahead of the control children.

Table 40

A Post First Grade[1] Comparison between the Experimental (E_5) and Control (C_5) Groups on the Stanford Achievement[5] Test I

		POST FIRST GRADE					
Measure	Grp.	N	YLTLP	SAT I Grade Score		Diff. bet. Grps.	t
				$\bar{X}$	SD		
SAT I							
Word	E_5	17	2	1.6	.34		
Reading	C_5	20	0	1.3	.41	.3	2.79**
Paragraph	E_5	17	2	1.7	.30		
Meaning	C_5	20	0	1.4	.53	.3	2.38*
Vocabulary	E_5	17	2	1.6	.58		
	C_5	20	0	1.4	.49	.2	1.55
Spelling	E_5	17	2	2.4	.56		
	C_5	20	0	1.2	.61	1.3	6.22***
Word Study	E_5	17	2	1.8	.54		
Skills	C_5	20	0	1.4	1.02	.4	1.19
Arithmetic	E_5	17	2	2.4	.46		
	C_5	20	0	1.4	.56	1.0	5.72***

*$p < .05$ **$p < .01$ ***$p < .001$

[1] After two years of the LTLP

A post second grade comparison (one year after termination of the Learning to Learn Program) between the experimental (E_5) and control (C_5) groups on the Stanford Ahcievement Test II is presented in Table 41. The E_5 group performed significantly better than the C_5 group on six of eight subtests. On all subtests of the Stanford Achievement Test II, the grade scores of the E_5 children were higher than the control children. The differences ranged from a .3 grade score difference on Word Study Skills and Language to a 1.2 year grade score difference on the Spelling subtest.

Table 41

A Post Second Grade[1] Comparison between the Experimental (E_5) and Control (C_5) Groups on the Stanford Achievement Test II.

		POST SECOND GRADE						
Measure	Grp.	N	YLTLP	YATLTLP	SAT II Grade Score		Diff. bet. Grps.	t
					$\bar{X}$	SD		
SAT II								
Word	E_5	15	2	1	2.6	.43		
Meaning	C_5	19	0	NA	1.9	.64	.7	3.65***
Paragraph	E_5	15	2	1	2.2	.60		
Meaning	C_5	19	0	NA	1.6	.72	.6	2.45*
Science &	E_5	15	2	1	2.7	.87		
Social Studies	C_5	19	0	NA	1.9	.50	.8	3.40**
Spelling	E_5	15	2	1	2.8	.58		
	C_5	19	0	NA	1.6	1.32	1.2	3.28**
Word Study	E_5	15	2	1	2.3	.73		
Skills	C_5	19	0	NA	2.0	.87	.3	1.10
Language	E_5	15	2	1	2.5	.40		
	C_5	19	0	NA	2.2	.84	.3	.98
Arith. Comp.	E_5	15	2	1	2.5	.61		
	C_5	19	0	NA	2.0	.85	.5	2.11*
Arith. Concept	E_5	15	2	1	2.6	.72		
	C_5	19	0	NA	1.7	.68	.9	3.81***

*$p < .05$ **$p < .01$ ***$p < .001$

[1] One year after termination of the LTLP

The experimental (E_4) group's overall performance on the Stanford Achievement Test I was superior to the C_4 children. The differences between the two groups on the various subtests of the Stanford Achievement were not only of statistical significance (t ranging from 4.72 to 10.28, $p < .001$) but a practical educational difference was present with grade score differences between the groups ranging from .6 to 1.3 grade scores (Table 42). It is interesting to note that the Arithmetic and Spelling subtests displayed greatest grade score differences between the two groups with a 1.0 and 1.2 grade score difference in favor of the experimental group.

Table 42

A Post First Grade[1] Comparison between the Experimental (E_4) and Control (C_4) Groups on the Stanford Achievement Test I

		POST FIRST GRADE					
Measure	Grp.	N	YLTLP	SAT I Grade Score		Diff. bet. Grps.	t
				$\bar{X}$	SD		
SAT I							
Word	E_4	20	3	1.9	.28		
Reading	C_4	17	0	1.3	.22	.6	6.51***
Paragraph	E_4	20	3	2.0	.40		
Meaning	C_4	17	0	1.2	.61	.8	4.72***
Vocabulary	E_4	20	3	2.1	.53		
	C_4	17	0	1.3	.17	.8	5.79***
Spelling	E_4	20	3	2.5	.48		
	C_4	17	0	1.3	.60	1.2	6.83***
Word Study	E_4	20	3	2.1	.43		
Skills	C_4	17	0	1.4	.25	.7	5.78***
Arithmetic	E_4	20	3	2.3	.27		
	C_4	17	0	1.3	.28	1.0	10.28***

***$p < .001$

[1] After three years of the LTLP

When comparing the two experimental groups on the SAT I a definite trend appears. The E_4 group who participated in the Program three years beginning at age 4 out performed the E_5 group who participated in the program for two years beginning at age 5, on five of the six subtests. Four of these subtest differences reached statistical significance at the .05 level, namely, Vocabulary, Paragraph Meaning, Word Reading and Spelling. The Arithmetic and Spelling subtests showed the highest grade scores for the experimental group. Although there was no

significant difference between the experimental groups on the Arithmetic and Spelling subtests it is quite obvious from the grade scores that both groups have reached a high degree of proficiency in arithmetic and spelling at the end of First Grade.

When comparing the two control groups (C_4 vs C_5) on the same subtest measures of the Stanford Achievement Test, there is no appreciable difference between them on the various subtests. The largest grade score difference appeared in the Paragraph Meaning subtest (C_4 = 1.2; C_5 = 1.4) however, this did not reach statistical significance. The remaining five subtests yielded grade score differences ranging from 0 to .1.

Table 43

A Post First Grade Comparison between the Experimental (E_4 vs E_5) and between the Control (C_4 vs C_5) Groups on the Stanford Achievement Test I (SAT I)

Measure	Grp.	N	YLTLP	SAT I Grade Score $\bar{X}$	SD	Diff. bet. Grps.	t
				POST FIRST GRADE			
SAT I							
Word	E_4	20	3	1.9	.28		
Reading	E_5	17	2	1.6	.34	.3	2.24*
	C_4	17	0	1.3	.22		
	C_5	20	0	1.3	.41	0	0.24
Paragraph	E_4	20	3	2.0	.40		
Meaning	E_5	17	2	1.7	.30	.3	2.27*
	C_4	17	0	1.2	.61		
	C_5	20	0	1.4	.53	.2	-0.92
Vocabulary	E_4	20	3	2.1	.53		
	E_5	17	2	1.6	.58	.5	2.28*
	C_4	17	0	1.3	.17		
	C_5	20	0	1.4	.50	.1	-0.71
Spelling	E_4	20	3	2.5	.48		
	E_5	17	2	2.4	.56	.1	0.29
	C_4	17	0	1.3	.60		
	C_5	20	0	1.2	.61	.1	0.24
Word Study	E_4	20	3	2.1	.43		
Skills	E_5	17	2	1.8	.54	.3	2.18*
	C_4	17	0	1.4	.25		
	C_5	20	0	1.4	1.02	0	-0.03
Arithmetic	E_4	20	3	2.3	.27		
	E_5	17	2	2.4	.46	.1	-0.69
	C_4	17	0	1.3	.28		
	C_5	20	0	1.4	.56	.1	-0.25

*$p < .05$

Reading Ability

A post first grade comparison between the E_5 and C_5 groups on the subtests of the Stanford Achievement I and the Primary Mental Abilities I which are related to reading ability is presented in Table 44 and Figures 11 and 12.

The E_5 group's reading performance was statistically superior on three of the four reading measures.

A post second grade reading comparison between the E_5 and C_5 groups is presented in Table 45 and Figures 11, 12, and 13. The E_5 group scored significantly higher than the control children on six of the seven reading measures. The probability level ranges from .05 on Paragraph Meaning to .001 on Word Meaning, Word Recognition, and Instructional Reading Level. The Potential Reading Level of the two groups was not significantly different. It should be pointed out that this subscale of the Spache is a measure of listening ability.

Comparisons between the E_4 and C_4 Groups

A post first grade comparison between the E_4 and C_4 groups on the individual and group measures of reading ability is presented in Table 46 and Figures 11, 12, and 14.

The E_4 group was statistically superior to the control children on all seven measures of reading ability. The level of significance was beyond .001 on each of the reading measures. On six of the seven reading measures the E_4 group was above grade level as compared to only one for the C_4 group.

Table 44

A Post First Grade[1] Comparison between the Experimental (E_5) and Control (C_5) Groups on Reading Measures

Measure	Grp.	N	YLTLP	Grade Scores $\bar{X}$	Grade Scores SD	Diff. bet. Grps.	Grade Levels $\geq$ 1.9	t
POST FIRST GRADE								
SAT I								
Word Reading	E_5	17	2	1.6	.34		- .3	
	C_5	20	0	1.3	.41	3	- .6	2.79**
Paragraph	E_5	17	2	1.7	.30		- .2	
Meaning	C_5	20	0	1.4	.53	3	- .5	2.38*
Vocabulary	E_5	17	2	1.6	.58		- .3	
	C_5	20	0	1.4	.49	2	- .5	1.55
				CA (mths)	PMA MA (mths)		MA $\geq$ CA (mths)	
					$\bar{X}$ SD			
PMA								
Verbal	E_5	17	2	83	75 7.6		- 8	
Meaning	C_5	20	0	81	69 8.5	6	-12	2.09*

*p < .05 **p < .01

[1] After two years of the LTLP.

Figure 11

A Post First and Second Grade Comparisons between the Experimental (E_4, E_5) and Control Groups (C_4, C_5) on the Reading Subtests of the Stanford Achievement Test I and II

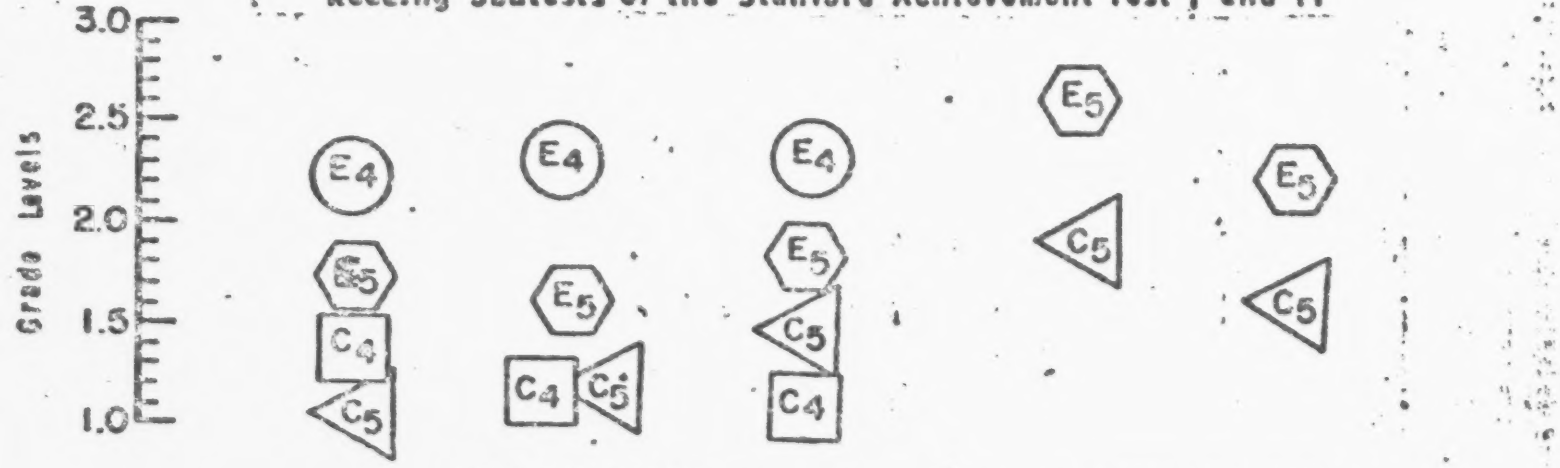


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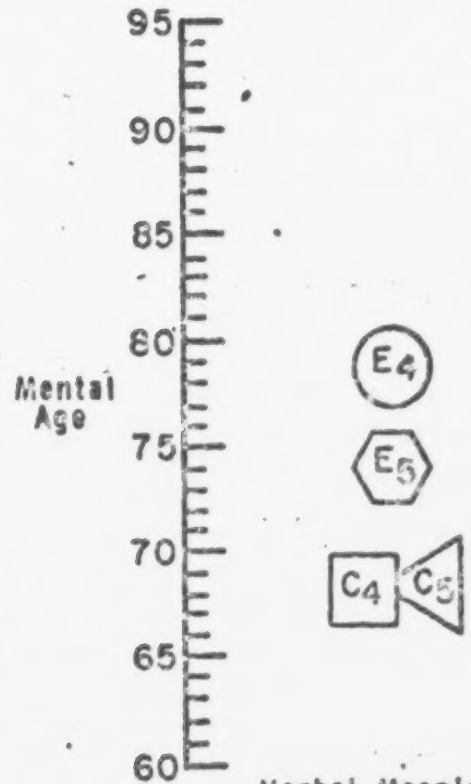
Figure 12 79

A Post 1st and 2nd Grade Comparison between the Experimental (E_4, E_5) and Control Groups (C_4, C_5) on the Verbal Meaning Subtest of the Primary Abilities I and II



Verbal Meaning Post 1st PMA I
E_4 = 78
E_5 = 74
C_4 = 68
C_5 = 68

Verbal Meaning Post 2nd (one year after termination of the LTUP) PMA II
E_5 = 93
C_5 = 83

Table 45

A Post Second Grade Comparison between the Experimental (E_5) and Control (C_5) Groups on Reading Measures

Measure	Grp.	N	YLTLP	YATLTLP	Grade Scores		Diff. bet. Grps.	Grade level ↗ 2.9	t
					X	SD			
POST SECOND GRADE									
Spache									
Word Recognition Level	E_5	16	2	1	3.3	.91		+ .4	
	C_5	20	0	NA	2.1	1.17	1.2	- .8	3.50**
Instructional Reading Level	E_5	16	2	1	3.3	.99		+ .4	
	C_5	20	0	NA	1.9	1.19	1.4	-1.0	3.81***
Potential Reading Level	E_5	16	2	1	3.6	.94		+ .7	
	C_5	20	0	NA	2.9	1.38	.7	0	1.61
SAT II									
Word Meaning	E_5	15	2	1	2.6	.43		- .3	
	C_5	19	0	NA	1.9	.64	.7	-1.0	3.65***
Paragraph Meaning	E_5	15	2	1	2.2	.60		- .7	
	C_5	19	0	NA	1.6	.72	.6	-1.3	2.45*

(Con't on next page)

Table 45 con't

Measure	Grp.	N	YLTLP	YATLTLP	CA (mths) $\bar{X}$	MA (mths) $\bar{X}$	MA (mths) SD	Diff. bet. Grps.	MA ≷ CA	t
POST SECOND GRADE										
PMA II										
Verbal Meaning	E_5	15	2	1	94	93	7.9		- 1	
	C_5	20	0	NA	93	83	7.5	10	-10	3.91***
					Grades $\bar{X}$		Grades SD		Grades ≷ "C" (2.0)	
School Grades Reading	E_5	16	2	1	2.3		.50		+ .3	
	C_5	19	0	NA	1.6		.77	.7	- .4	2.87**

*p < .05 **p < .01 ***p < .001

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FIGURE 13 73

A POST SECOND GRADE COMPARISON BETWEEN THE EXPERIMENTAL (E_5) and CONTROL (C_5) GROUPS ON THE SPACHE DIAGNOSTIC READING TEST

POST SECOND GRADE READING GRADE LEVELS
(ONE YEAR AFTER TERMINATION OF LTLP)

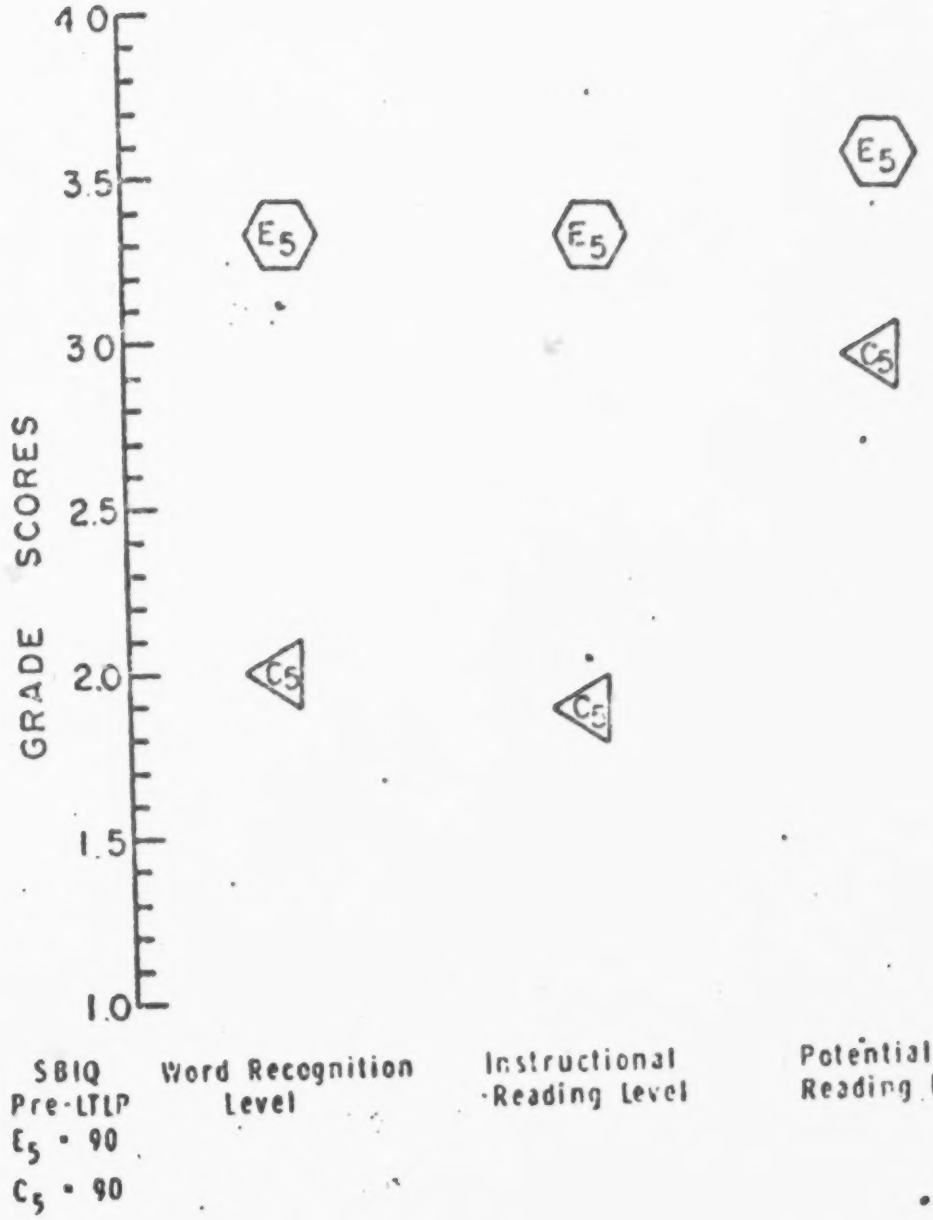


Table 46

A Post First Grade[1] Comparison between the Experimental (E_4) and Control (C_4) Groups on Reading Measures

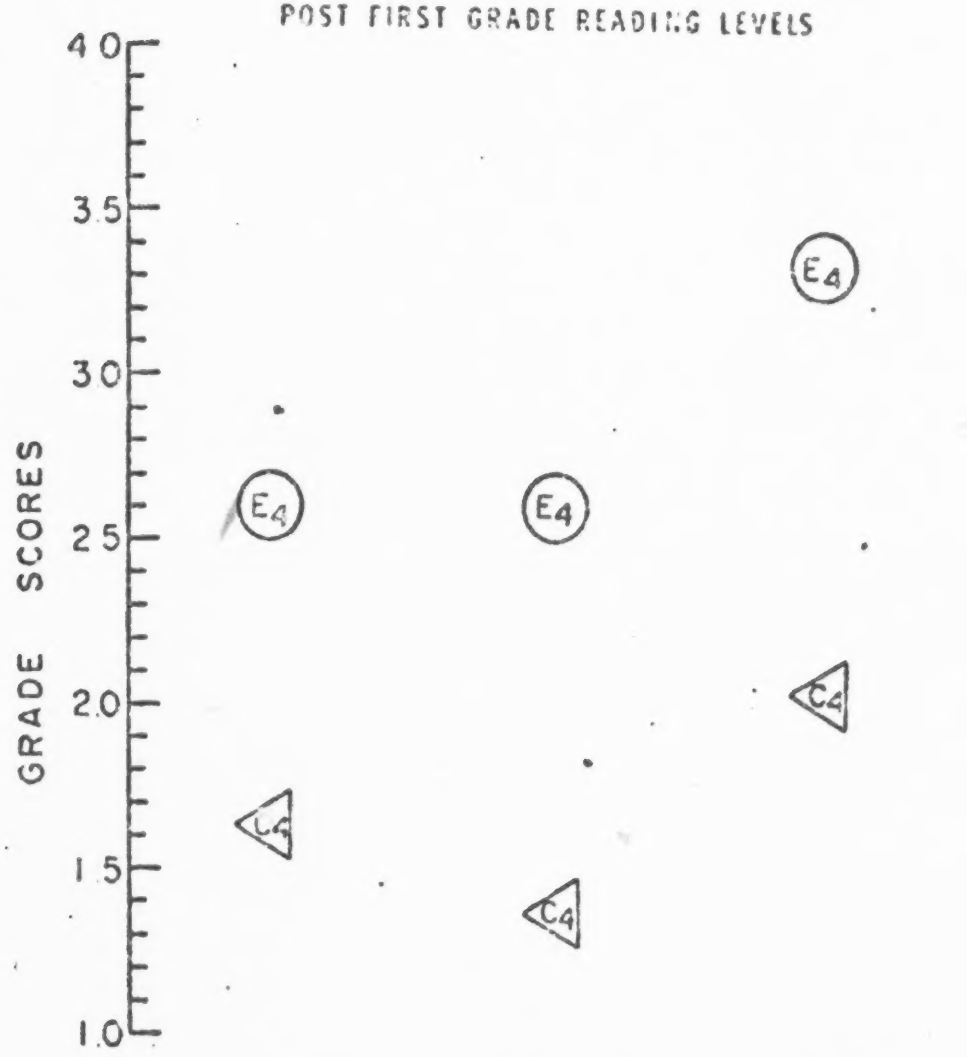
Measure	Grp.	N	YLTLP	POST FIRST GRADE Grade Score $\bar{X}$	SD	Diff. bet. Grps.	Grade Levels ± 1.9	t
Spache								
Word Recognition Level	E_4	20	3	2.6	.61		+ .7	
	C_4	18	0	1.6	.66	1.0	- .3	5.17***
Instructional Reading Level	E_4	20	3	2.5	.63		+ .6	
	C_4	18	0	1.3	.53	1.2	- .6	6.46***
Potential Reading Level	E_4	20	3	3.5	.92		+1.6	
	C_4	18	0	2.0	.96	1.5	+ .1	4.78***
SAT I								
Word Reading	E_4	20	3	1.9	.28		0	
	C_4	17	0	1.3	.22	.6	- .6	6.51***
Paragraph Meaning	E_4	20	3	2.0	.40		+ .1	
	C_4	17	0	1.2	.61	.8	- .8	4.72***
Vocabulary	E_4	20	3	2.1	.53		+ .2	
	C_4	17	0	1.3	.17	.8	- .6	5.79***
				CA(mths)	MA (mths) $\bar{X}$	SD	MA ≷ CA	
PMA								
Verbal Meaning	E_4	20	3	82	78	6.0	-4	
	C_4	18	0	81	68	7.9	-13	4.19***

[1]After three years of the LTLP

***$p < .001$

FIGURE 14 75

A POST FIRST GRADE COMPARISON BETWEEN THE EXPERIMENTAL (E_4) and CONTROL (C_4) GROUPS ON THE SPACHE DIAGNOSTIC READING TEST



SBIQ
Pre-LTLP
E_4 · 88
C_4 · 88

Language

The Illinois Test of Psycholinguistic Abilities

A pre program comparison between the two subtests of the ITPA (Auditory-Vocal Association and Vocal Encoding) is presented in Table 47. No significant differences existed between the E_5 and C_5 groups when the subjects were selected. (t = .13, AVA subtest; t = .24 VE subtest). The language age of both the experimental and control groups was markedly lower than their chronological age on both subtests.

Table 47

A Pre Learning to Learn Program Comparison between the Experimental (E_5) and Control (C_5) Groups on Two Subtests of the Illinois Test of Psycholinguistic Abilities

		PRE LEARNING TO LEARN PROGRAM							
Measure	Grp.	N	YLTLP	CA (mths)	LA (mths)		Diff. bet. Grps.	LA < > CA (mths)	t
				$\bar{X}$	$\bar{X}$	SD			
Auditory-Vocal Assoc.	E_5	17	0	62	46	7.5		-16	
	C_5	18	0	62	46	13.0	0	-16	.13
Vocal Encoding	E_5	17	0	62	52	10.7		-10	
	C_5	18	0	62	53	14.8	(1)	- 9	.24

Table 48 is a post kindergarten comparison between the E_5 and C_5 groups on four subtests of the ITPA. On two of the four subtests (Visual Motor Association and Auditory-Vocal Association) the E_5 group scored significantly higher than the C_5 controls with a 9 month language age difference on VMA, and a 10 month language age difference on AVA subtests. After one year in the experimental program the E_5 group's language age was higher than their chronological age on these two subtests. On the VMA subtest their language age was 5 months above their chronological age and on the AVA subtest, their language age exceeded their chronological age by 1 month. The C_5 group's language age ranged from 3 to 8 months below their chronological age on the four subtests of the ITPA.

Table 48

A Post Kindergarten[1] Comparison between the Experimental (E_5) and Control (C_5) Groups on Four Subtests of the Illinois Test of Psycholinguistic Abilities

		POST KINDERGARTEN							
Measure	Grp.	N	YLTLP	CA (mths)	LA (mths)		Diff. bet. Grps.	LA ≷ CA (mths)	t
				$\bar{X}$	$\bar{X}$	SD			
Visual Decoding	E_5	21	1	71	66	12.9		-5	
	C_5	21	0	70	65	14.5	1	-5	0.14
Visual Motor Assoc.	E_5	21	1	71	76	13.8		+5	
	C_5	21	0	70	67	11.8	9	-3	2.40*
Vocal Encoding	E_5	21	1	71	62	13.1		-9	
	C_5	21	0	70	64	11.1	(2)	-6	0.39
Auditory-Vocal Assoc.	E_5	21	1	71	72	11.4		+1	
	C_5	21	0	70	62	14.6	10	-8	2.20*

*$p < .05$

[1] After one year of the LTLP

A post first grade comparison between the E_5 and C_5 groups on four subtests of the ITPA is presented in Table 49. The experimental children scored higher than the control children on all four subtests. The language age differences ranged from 7 months on the Visual Decoding subtest to 18 months on the Auditory-Vocal Association subtest. Two of the four subtests, Vocal Encoding and Auditory-Vocal Association, were significant in favor of the E_5 group, (VE, $t = 2.10$, $p < .05$; AVA, $t = 3.76$, $p < .001$). Only on the Auditory-Vocal Association subtest was the E_5's language age greater than their chronological age. On two of the remaining three subtests, however, the E_5's language age was approaching their chronological age. When making the same comparison for the C_5 group the language age was much lower than their chronological age, ranging from -7 months on Visual Motor Association to -13 months on the Vocal Encoding and Auditory-Vocal Association subtests.

Table 49

A Post First Grade[1] Comparison between the Experimental (E_5) and Control (C_5) Groups on Four Subtests of the Illinois Test of Psycholinguistic Abilities

		POST FIRST GRADE							
Measure	Grp.	N	YLTLP	CA (mths)	LA (mths)		Diff. bet. Grps.	LA < CA (mths)	t
				$\bar{X}$	$\bar{X}$	SD			
Visual Decoding	E_5	17	2	83	77	12.9		- 6	
	C_5	20	0	81	70	14.8	7	-11	1.56
Visual Motor Assoc.	E_5	17	2	83	82	11.4		- 1	
	C_5	20	0	81	74	19.3	8	- 7	1.43
Vocal Encoding	E_5	17	2	83	79	13.7		- 4	
	C_5	20	0	81	68	18.3	11	-13	2.10*
Auditory-Vocal Assoc.	E_5	17	2	83	86	14.6		+ 3	
	C_5	20	0	81	68	15.4	18	-13	3.76***

*p < .05 ***p < .001

[1]After two years of the LTLP

One year after the termination of the Learning to Learn Program (post second grade) the experimental and control groups were again compared on the four subtests of the ITPA, (Table 50).

On two of the four subtests (Visual Motor Association and Auditory-Vocal Association) the E_5 group was statistically superior to the C_5 group ($p < .05$; VMA; $p < .001$, AVA). Only on the Visual Motor Association and the Auditory-Vocal Association subtests did the language age of the experimental group closely approximate their chronological age. When making the same comparison for the C_5 group their language age ranged from 5 months lower than their chronological age on the Visual Decoding subtest to 18 months lower on Vocal Encoding subtest.

Table 50

A Post Second Grade[1] Comparison between the Experimental (E_5) and Control (C_5) Groups on Four Subtests of the Illinois Test of Psycholinguistic Abilities

		POST SECOND GRADE								
Measure	Grp.	N	YLTLP	YATLTLP	CA (mths)	LA (mths)		Diff. bet. Grps.	LA ↗ CA (mths)	t
					$\bar{X}$	$\bar{X}$	SD			
Visual Decoding	E_5	16	2	1	94	84	16.0		-10	
	C_5	20	0	NA	93	88	15.5	(4)	- 5	-0.72
Visual Motor Assoc.	E_5	16	2	1	94	93	18.2		- 1	
	C_5	20	0	NA	93	82	13.8	11	-11	1.96*
Vocal Encoding	E_5	16	2	1	94	77	16.4		-17	
	C_5	20	0	NA	93	75	12.5	2	-18	0.53
Auditory-Vocal Assoc.	E_5	16	2	1	94	91	12.0		- 3	
	C_5	20	0	NA	93	78	9.3	13	-15	3.70***

*$p < .05$ ***$p < .001$

[1] One year after termination of the LTLP

Table 51 represents a post nursery school comparison between the E_4 and C_4 groups on four subtests of the ITPA. The E_4 group scored higher than the C_4 group on all subtests of the ITPA, ranging from 11 language age months on the AVA subtest to 19 language age months on the VMA subtest. The differences were of practical as well as of statistical significance, the t values ranged from 2.80, ($p < .01$) on Visual Decoding to 4.38 on Vocal Encoding ($p < .001$). On two of the four subtests the E_4 group had a language age greater than their chronological age (VMA, +5; VE, +2). The C_4 group's language age was considerably lower than their chronological age on the four subtests on the ITPA, ranging from 12 months below on the VMA subtest to 18 months below on the VD subtest.

Table 51

A Post Nursery[1] Comparison between the Experimental (E_4) and Control (C_4) Groups on Four Subtests of the Illinois Test of Psycholinguistic Abilities

		POST NURSERY							
Measure	Grp.	N	YLTLP	CA (mths)	LA (mths)		Diff. bet. Grps.	LA ≷ CA (mths)	t
				$\bar{X}$	$\bar{X}$	SD			
Visual Decoding	E_4	22	1	60	53	15.2		- 7	
	C_4	20	0	58	40	15.0	13	-18	2.80**
Visual Motor Assoc.	E_4	22	1	60	65	15.0		+ 5	
	C_4	20	0	58	46	19.3	19	-12	3.55***
Vocal Encoding	E_4	22	1	60	62	10.8		+ 2	
	C_4	20	0	58	45	13.6	17	-13	4.38***
Auditory-Vocal Assoc.	E_4	22	1	60	52	12.8		- 8	
	C_4	20	0	58	41	9.3	11	-17	3.19**

**$p < .01$ ***$p < .001$

[1] After one year in the LTLP

A post kindergarten comparison between the E_4 and C_4 groups on four subtests of the ITPA is presented in Table 52. The results of this analysis indicate that the E_4 group after two years in the Learning to Learn Program scored higher than the control children. The difference ranged from 2 language age months on the Visual Decoding subtest to 11 language age months on the Auditory Vocal Association subtest. The E_4 group scored significantly better than the C_4 group on the Visual Motor Association subtest ($t = 2.00$, $p < .05$) and on the Auditory-Vocal Association subtest ($t = 2.73$, $p < .05$). The E_4 children had improved their language age deficit from the previous years. Only on two subtests is their language age below their chronological age and the differences there were not substantial. On the Auditory Vocal Association subtest and the Visual Motor Association subtests the E_4 group's language age is equal to or greater than their chronological age. The language age of the C_4 group is slightly above their chronological age on the Visual Motor Association subtest. However on the two expressive language subtests, Vocal Encoding and Auditory Vocal Association, the C_4 group's language age was 8 and 9 months less than their chronological age.

Table 52

A Post Kindergarten[1] Comparison between the Experimental (E_4) and Control (C_4) Groups on Four Subtests of the Illinois Test of Psycholinguistic Abilities

Measure	Grp.	N	YLTLP	CA (mths)	LA (mths)		Diff. bet. Grps.	LA ≷ CA (mths)	t
				$\bar{X}$	$\bar{X}$	SD			
			POST KINDERGARTEN						
Visual Decoding	E_4	22	2	71	70	9.6		-1	
	C_4	20	0	69	68	17.9	2	-1	.33
Visual Motor Assoc.	E_4	22	2	71	80	11.5		+9	
	C_4	20	0	69	71	17.3	9	+2	2.00*
Vocal Encoding	E_4	22	2	71	68	18.6		-3	
	C_4	20	0	69	61	16.3	7	-8	1.32
Auditory-Vocal Assoc.	E_4	22	2	71	71	13.3		0	
	C_4	20	0	69	60	13.7	11	-9	2.73**

*$p < .05$ **$p < .01$

[1] After two year in the LTLP

The post first grade comparison between experimental (E_4) and control (C_4) groups on four subtests of the ITPA is presented in Table 53. On all four subtests the E_4 group performed better than the controls. The differences ranged from 6 language age months on the Visual Decoding subtest to 23 months on the Vocal Encoding subtest. Three of the four subtests were statistically significant in favor of the E_4 group. After three years in the Learning to Learn Program the E_4 group has moved from a language age less than their chronological age on all four subtests to one where their language age is greater than their chronological age. This does not hold true for the control group. Only on one subtest (Visual Decoding) is their language age equal to their chronological age. On the remaining three subtests their language age ranged from 3 to 19 months below their chronological age.

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Table 53

A Post First Grade[1] Comparison between the Experimental (E_4) and Control (C_4) Groups on Four Subtests of the Illinois Test of Psycholinguistic Abilities

		POST FIRST GRADE							
Measure	Grp.	N	YLTLP	CA (mths)	LA (mths)		Diff. bet. Grps.	LA ≷ CA (mths)	t
				$\bar{X}$	$\bar{X}$	SD			
Visual Decoding	E_4	19	3	82	87	16.3		+ 5	
	C_4	18	0	81	81	14.5	6	0	1.27
Visual Motor Assoc.	E_4	19	3	82	87	16.2		+ 5	
	C_4	18	0	81	78	13.5	9	- 3	1.85*
Vocal Encoding	E_4	20	3	82	85	16.8		+ 3	
	C_4	18	0	81	62	19.0	23	-19	4.07***
Auditory-Vocal Assoc.	E_4	20	3	82	90	13.4		+ 8	
	C_4	18	0	81	69	10.9	21	-12	5.39***

*$p < .05$ ***$p < .001$

[1] After three years of the LTLP.

A post kindergarten comparison between the E_4 and E_5 experimental groups and between the C_4 and C_5 control groups on four subtests of the ITPA is presented in Table 54. The E_4 group scored higher than the E_5 group on three of the four subtests of the ITPA. Although the differences ranged from 3 to 6 language age months, they did not reach statistical significance. When making LA - CA comparisons between the experimental groups the E_4 group showed better language facility than the E_5 group. When making the same comparisons between the control groups the results of the analysis reveal no statistical difference between the C_4 and C_5 groups on the four subtests of the ITPA. The language age difference between the two groups is quite similar ranging from 2 language age months on the Auditory-Vocal Association subtest to four language age months difference on the Visual Motor Association subtest.

Table 54

A Post Kindergarten Comparison between the Experimental (E_4 vs E_5) Groups and between the Control (C_4 vs C_5) Groups on Four Subtests of the Illinois Test of Psycholinguistic Abilities

		POST KINDERGARTEN							
Measure	Grp.	N	YLTLP	CA (mths)	LA (mths)		Diff. bet. Grps.	LA $\gtrless$ CA	t
				$\bar{X}$	$\bar{X}$	SD			
Visual Decoding	E_4	22	2	71	70	9.6		-1	
	E_5	21	1	71	66	12.9	4	-5	1.05
	C_4	20	0	69	68	17.9		-1	
	C_5	21	0	70	65	14.5	3	-5	0.61
Visual Motor Assoc.	E_4	22	2	71	79	11.5		+8	
	E_5	21	1	71	76	13.8	3	+5	1.01
	C_4	20	0	69	71	17.3		+2	
	C_5	21	0	70	67	11.8	4	-3	.91
Vocal Encoding	E_4	22	2	71	68	18.6		-3	
	E_5	21	1	71	62	13.1	6	-9	1.04
	C_4	20	0	69	61	16.3		-8	
	C_5	21	0	70	64	11.1	3	-6	0.67
Auditory-Vocal Assoc.	E_4	22	2	71	71	13.3		0	
	E_5	21	1	71	72	11.4	1	+1	0.04
	C_4	20	0	69	60	13.7		-9	
	C_5	21	0	70	62	14.6	2	-8	0.58

A post first grade comparison between the experimental (E_4 vs E_5) groups and between the control (C_4 vs C_5) groups on the ITPA subtests is presented in Table 55 .

On all four subtests the language age of the E_4 group was superior to the language age of the E_5 group. However, only one subtest, Visual Decoding, reached statistical significance ($t = 1.95$, $p < .05$).

The language age difference between the experimental groups ranges from 4 months on the Auditory Vocal Association subtest to 9 months on Visual Decoding. When making the same comparisons between the C_4 and C_5 groups, the language

ages were quite similar on the Visual Motor Association subtest, and the Auditory Vocal Association subtest with a 4 month and a 1 month language age difference. Only on the Visual Decoding subtest where there was an 11 months language age difference did it reach statistical significance ($t = 2.14$, $p < .05$).

Both the C_4 and C_5 groups had a language age less than their chronological age on all four of the ITPA subtests.

Table 55

A Post First Grade Comparison between the Experimental (E_4 vs E_5) Groups and between the Control (C_4 vs C_5) Groups on Four Subtests of the Illinois Test of Psycholinguistic Abilities

		POST FIRST GRADE							
Measure	Grp.	N	YLTLP	CA (mths)	LA (mths)		Diff. bet. Grps.	LA < > CA (mths)	t
				$\bar{X}$	$\bar{X}$	SD			
Visual Decoding	E_4	20	3	82	86	16.1		+ 4	
	E_5	17	2	83	77	13.0	9	- 6	1.95*
	C	18	0	81	81	14.5		0	
	C_5	20	0	81	70	14.8	11	-11	2.14*
Visual Motor Assoc.	E_4	20	3	82	87	15.8		+ 5	
	E_5	17	2	83	82	11.4	5	- 1	1.10
	C_4	18	0	81	78	13.5		- 3	
	C_5	20	0	81	74	19.3	4	- 7	0.60
Vocal Encoding	E_4	20	3	82	85	16.8		+ 3	
	E_5	16	2	83	79	14.1	6	- 4	1.27
	C_4	18	0	81	62	19.0		-19	
	C_5	20	0	81	68	18.3	6	-13	-1.01
Auditory-Vocal Assoc.	E_4	20	3	82	90	13.4		+ 8	
	E_5	16	2	83	86	14.7	4	+ 3	0.95
	C_4	18	0	81	69	10.9		-12	
	C_5	20	0	81	68	15.4	1	-13	0.06

*$p < .05$

Verbal Stories

Each child was individually shown the W-5, I Wonder Card, from the Peabody Language Development Kit, Level II and asked to tell the best story he could about the picture. The children's verbal stories were taped and later transcribed and rated for creativity, abstraction, and language quality on the basis of a six point scale. A copy of the rating scale is in the Appendix. The stories were also analyzed in terms of total number of sentences and mean length of remark.

Table 56 represents post first grade and post second grade comparisons between the E_5 and C_5 groups on ratings of their verbal stories for levels of Creativity, Abstraction, and Language Quality. At the end of first grade the E_5 group performed better than the control children on all three of these measures. The mean rating score differences between the two groups ranged from .4 points on Language Quality to .6 points on Creativity, but were not statistically significant.

When the same comparisons were made one year after termination of the Learning to Learn Program (post second grade) the E_5 group's ratings on the same variables were now statistically significant ($p < .01$, Language Quality; $p < .001$ on Creativity and Abstraction). The E_5 group's mean ratings on these measures increased during the second grade, while the mean ratings for the control group remained at the post first grade level.

A post first and post second grade comparison between the E_5 and C_5 groups on verbal language performance is presented in Table 57. The verbal stories of the experimental children contained a greater number of sentences and their remarks had a greater number of words. The difference between the E_5 and C_5 groups on these measures were not significantly different at the end of the first grade. One year after the termination of the Learning to Learn Program (post second grade) the verbal stories of the E_5 and C_5 children contained approximately the same number of sentences. When comparing the experimental and control groups on length of remarks, the E_5 group's performance was statistically superior to the C_5 group, ($p < .001$). The analysis of the E_5 children's verbal stories indicated that their length of remarks increased from post first grade to post second grade while those of the control children decreased by over one word.

A post kindergarten and post first grade comparisons between the E_4 and C_4 groups on language ratings of Creativity, Abstraction, and Language Quality are presented in Table 58. The E_4 children's language ratings were higher than the control children on all three measures, however, these differences did not reach statistical significance. When comparing the E_4 and C_4 groups on the same measures at the end of first grade the E_4 group's language ratings were significantly superior on all three ratings ($p < .001$). The language ratings for the E_4 children increased on all three measures by approximately one point while the control group remained relatively constant after an additional year of education.

Table 56

A Post First and Post Second Grade Comparison between the Experimental (E_5) and Control (C_5) Groups of Verbal Stories on Creativity, Abstraction, and Language Quality

Measure	Grp.	POST FIRST GRADE N	YLTLP	Rating $\bar{X}$	Rating SD	Diff. bet. Grps.	t	POST SECOND GRADE N	YLTLP	YATLTLP	Rating $\bar{X}$	Rating SD	Diff. bet. Grps.	t
Verbal Stories														
Creativity	E_5	17	2	3.9	1.2			15	2	1	4.9	0.9		
	C_5	20	0	3.3	1.2	.6	1.77	20	0	NA	3.4	0.9	1.5	5.12**
Abstraction	E_5	17	2	4.4	1.1			16	2	1	4.9	0.8		
	C_5	20	0	3.9	1.1	.5	1.55	20	0	NA	3.9	0.9	1.0	3.86**
Language Quality	E_5	17	2	3.7	0.9			16	2	1	4.2	0.9		
	C_5	20	0	3.3	0.8	.4	1.66	20	0	NA	3.4	0.9	.8	2.63*

*p< .05 ***p<.001

Table 57

A Post First and Post Second Grade Comparison between the Experimental (E_5) and Control (C_5) Groups of Verbal Stories on Number of Sentences and Length of Remark

		POST FIRST GRADE						POST SECOND GRADE						
Measure	Grp.	N	YLTLP	$\bar{X}$	SD	Diff. bet. Grps.	t	N	YLTLP	YATLTLP	$\bar{X}$	SD	Diff. bet. Grps.	t
Verbal Stories														
Number of Sentences	E_5	17	2	6.3	4.0			16	2	1	8.7	3.0		
	C_5	20	0	4.3	2.6	2.0	1.84	20	0	NA	8.3	5.2	.4	0.27
Length of Remark	E_5	17	2	10.0	4.1			16	2	1	10.9	2.8		
	C_5	20	0	8.4	4.0	1.6	1.17	20	0	NA	7.2	2.3	3.7	4.44***

***$p < .001$

Table 58

A Post Kindergarten and Post First Grade Comparison between Experimental (E_4) and Control (C_4) Groups of Verbal Stories on Creativity, Abstraction, and Language Quality

		POST KINDERGARTEN						POST FIRST GRADE					
Measure	Grp.	N	YLTLP	Rating		Diff. bet. Grps.	t	N	YLTLP	Rating		Diff. bet. Grps.	t
				$\bar{X}$	SD					$\bar{X}$	SD		
Verbal Stories													
Creativity	E_4	22	2	3.6	1.2			19	3	5.0	.7		
	C_4	20	0	3.1	.9	.5	1.31	18	0	3.2	1.1	1.8	6.04***
Abstraction	E_4	22	2	3.9	1.1			19	3	5.1	.7		
	C_4	20	0	3.4	1.1	.5	1.44	18	0	3.3	1.1	1.8	6.39***
Language Quality	E_4	22	2	3.5	1.1			19	3	4.4	.8		
	C_4	20	0	3.2	.8	.3	.76	18	0	3.0	.9	1.4	4.86***

***$p < .001$

The results of Table 59 indicate that when comparing the E_4 and C_4 groups on verbal language grade performance at the end of kindergarten and first grade that the E_4 groups showed superior language usage. They told longer stories by using a greater number of longer remarks than their controls.

At the end of kindergarten (two years of the Learning to Learn Program for the E_4 group) the differences between the experimental and control groups was not statistically significant for number of remarks , but length of sentences was significant at the .05 level. By the end of first grade (three years of the Learning to Learn Program for the E_4 group) the level of significance in favor of the E_4 group was .01 on number of sentences, and .001 on mean length of remark.

The E_4 group's verbal stories exhibited marked increases in both measures after an additional year in the Learning to Learn Program, while their controls remained relatively the same.

A post first grade comparison between the experimental (E_4 vs E_5) and control (C_4 vs C_5) groups on verbal stories is presented in Tables 60 and 61.

The E_4 group's language performance on four of the five measures was statistically superior to the E_5 group at the end of first grade. When the same comparisons were made between the C_4 and C_5 groups, only one of the measures was statistically different with the C_4 children having a greater number of sentences.

Table 59

A Post Kindergarten and Post First Grade Comparison between the Experimental (E_4) and Control (C_4) Groups of Verbal Stories on Number of Sentences and Length of Remark

		POST KINDERGARTEN						POST FIRST GRADE					
Measure	Grp.	N	YLTLP	$\bar{X}$	SD	Diff. bet. Grps.	t	N	YLTLP	$\bar{X}$	SD	Diff. bet. Grps.	t
Verbal Stories													
Number of Sentences	E_4	20	2	8.5	6.1			19	3	19.8	12.7		
	C_4	20	0	7.2	6.4	1.3	0.66	18	9	9.1	7.5	10.7	3.11**
Length of Remark	E_4	20	2	7.7	2.1			19	3	10.9	2.7		
	C_4	20	0	6.5	1.6	1.2	2.05*	18	0	6.5	2.7	4.4	4.96***

*$p < .05$ **$p < .01$ ***$p < .001$

Table 60

A Post First Grade Comparison between the Experimental (E_4 vs E_5) and between the Control (C_4 vs C_5) Groups of Verbal Stories on Creativity, Abstraction, and Language Quality

		POST FIRST GRADE					
Measure	Grp.	N	YLTLP	Rating $\bar{X}$	Rating SD	Diff. bet. Grps.	t
Verbal Stories							
Creativity	E_4	19	3	5.0	0.7		
	E_5	17	2	3.9	1.2	1.1	3.24**
	C_4	18	0	3.2	1.1		
	C_5	20	0	3.3	1.2	.1	-0.22
Abstraction	E_4	19	3	5.1	0.7		
	E_5	17	2	4.4	1.1	.7	2.40*
	C_4	18	0	3.3	1.1		
	C_5	20	0	3.9	1.1	.6	-1.77
Language Quality	E_4	19	3	4.4	0.8		
	E_5	17	2	3.7	0.9	.7	2.21*
	C_4	18	0	3.0	0.9		
	C_5	20	0	3.3	0.8	.3	-0.89

*p < .05 **p < .01

Table 61

A Post First Grade Comparison between the Experimental (E_4 vs E_5) and between the Control (C_4 vs C_5) Groups of Verbal Stories on Number of Sentences and Length of Remark

		POST FIRST GRADE					
Measure	Grp.	N	YLTLP	$\bar{X}$	SD	Diff. bet. Grps.	t
Verbal Stories							
Number of Sentences	E_4	19	3	19.8	12.7		
	E_5	17	2	6.3	4.0	13.5	4.20***
	C_4	18	0	9.1	7.5		
	C_5	20	0	4.3	2.6	4.8	2.68*
Length of Remark	E_4	19	3	10.9	2.7		
	E_5	17	2	10.0	4.1	.9	0.81
	C_4	18	0	6.5	2.7		
	C_5	20	0	8.4	4.0	1.9	-1.72

*p < .05 ***p < .001

Picture Story Language Test

A written language measure was given to obtain data for a comparative analysis of the children's facility with written as well as spoken language. The children were assembled into groups of 4 to 6, shown the Picture Card of the Myklebust Picture Story Language Test, and asked to write the best story they could about the picture. A brief description of this measure and the scoring criteria is in the Appendix (A-59).

The results indicate that when comparing the E_5 and C_5 groups on written language performance at the termination of the second grade, (Table 62) the experimental children are superior to their controls on all of the written language subtests. The p's ranged from the .05 level (Number of Sentences and Words per Sentence) to the .001 level (Total Words and Abstract-Concrete Level Attained).

Table 63 represents a post first grade comparison between the E_4 and C_4 groups on the Picture Story Language Test. The written language performance of the E_4 group is clearly superior to that of the control children. On all five subtests the E_4 group shows significant superiority ($p < .001$).

Table 62

A Post Second Grade Comparison between the Experimental (E_5) and Control (C_5) Groups on the Picture Story Language Test

Measure	Grp	N	YLTLP	YATLTLP	$\bar{X}$	SD	Diff. bet. Grps.	t
POST SECOND GRADE								
Picture Story Language Test								
Total Words	E_5	16	2	1	34.1	22.4		
	C_5	20	0	NA	12.5	12.6	21.6	3.68***
Number of Sentences	E_5	16	2	1	4.6	3.1		
	C_5	20	0	NA	2.5	2.6	2.1	2.22*
Words per Sentence	E_5	16	2	1	8.2	2.8		
	C_5	20	0	NA	5.1	5.2	3.1	2.12*
Abstract-Concrete Level Attained	E_5	16	2	1	3.2	0.8		
	C_5	20	0	NA	1.7	0.9	1.5	5.35***
Syntax Quotient	E_5	16	2	1	85.1	5.9		
	C_5	20	0	NA	49.3	42.3	35.8	3.35**

*p < .05 **p < .01 ***p < .001

Table 63

A Post First Grade Comparison between the Experimental (E_4) and Control (C_4) Groups on the Picture Story Language Test

Measure	Grp.	N	YLTLP	$\bar{X}$	SD	Diff. bet. Grps.	t
POST FIRST GRADE							
Picture Story Language Test							
Total Words	E_4	20	3	35.9	22.8		
	C_4	18	0	7.3	9.0	28.6	4.98***
Number of Sentences	E_4	20	3	4.7	2.3		
	C_4	18	0	1.7	1.8	3.0	4.35***
Words per Sentence	E_4	20	3	7.4	1.8		
	C_4	18	0	3.1	2.9	4.3	5.73***
Abstract-Concrete Level Attained	E_4	20	3	3.4	0.6		
	C_4	18	0	1.6	0.7	1.8	8.72***
Syntax Quotient	E_4	20	3	81.2	6.4		
	C_4	18	0	31.9	34.7	59.3	6.24***

***p < .001

Wepman Auditory Discrimination Test

The Wepman Auditory Discrimination Test (Forms I and II) was individually administered to the E_5 and C_5 children in order to measure their listening discrimination ability. Table 64 and Figure 15 represent a post second grade comparison between the E_5 and C_5 groups on both forms of the Wepman Auditory Discrimination Test. The E_5 group scored higher than the C_5 group on the Wepman Test, however the differences between the two groups did not reach statistical significance.

The distribution of E_5 and C_5 scores of the Wepman (Figure 15) yields some interesting data. This method of analysis indicates that only one child in the E_5 group had difficulty discriminating between the Wepman items; however, approximately one third of the C_5 group had difficulty in making auditory discriminations.

Table 64

A Post Second Grade Comparison between the E_5 and C_5 Groups on the Wepman Auditory Discrimination Test

		POST SECOND GRADE						
Measure	Grp.	N	YLTLP	YATLTLP	$\bar{X}$	SD	Diff. bet. Grps.	t
Wepman I	E_5	13	2	1	34.2	7.2		
	C_5	19	0	NA	30.3	6.5	3.9	1.62
Wepman II	E_5	13	2	1	34.5	7.5		
	C_5	19	0	NA	30.7	7.1	3.8	1.42
Wepman I & II	E_5	13	2	1	68.7	14.6		
	C_5	19	0	NA	61.0	13.1	7.7	1.56

FIGURE 15
A Post Second Grade Frequency Distribution Comparing the Experimental (E_5) and Control (C_5) Groups on the Wepman Auditory Discrimination Test Scores

		Wepman Test I f		Wepman Test II f			Wepman Test I and II f	
		E_5	C_5	E_5	C_5		E_5	C_5
Raw Score	40					Raw Score 80		
	38	2	1	6	3	76	4	
	36	7	4	2	2	72	5	5
	34	2	3	3	3	68	1	3
	32	1	2		3	64	2	3
	30		2	1	2	60		1
	28		1		1	56		
	26		1			52		3
	24		1		2	48		1
	22		1			44		
	20		2		2	40		2
	18					36		
	16		1			32		
	14					28		1
	12				1	24		
	10	1		1		20	1	

Mathematics

Table 65 and Figures 16 and 17 represent post first grade comparisons between the E_5 and C_5 groups on the two group measures of mathematical ability. The E_5 group was statistically superior to the control group on each of these measures. The experimental children's performance on the SAT I measure was above grade level and their mental age was above their chronological age on the Number Facility subtest of the PMA II. This was not true for the control children.

The results of the individually administered Mathematics Performance Measure are presented in Table 66. Each child was given a pencil and a paper with 4 groups of numbers on it and instructed to make up as many problems as he was able to. A copy of the measure, the instructions, and the scoring criteria are included in the Appendix. The E_5 group scored significantly better than the control group on all of the scoring criteria of the Mathematics Performance Measure. Four of the five measures were significant beyond the .001 level. It is of interest to point out that the E_5 children did not exhibit any handwriting reversals in writing the numbers on this test. This was not the case for the control children, where 50% of them exhibited reversals in their writings. ($\underline{t}$ = 3.33, $p < .001$)

The post second grade comparison between the E_5 and C_5 groups on mathematical ability is presented in Table 67 and Figures 17 and 18. On the individually administered arithmetic subtest of the WISC the E_5 group scored significantly above their controls ($\underline{t} = 2.70$; $p < .01$). Similar results were evident when comparing the E_5 and C_5 groups on the group measures of mathematics ability of the SAT II and PMA II. The E_5 group's statistical superiority on these subtests ranged from $p < .05$ (arithmetic comprehension; SAT II) to $p < .001$ (arithmetic concepts and number facility, PMA II).

When comparing the school grades obtained by the E_5 and C_5 groups in arithmetic at the end of second grade, the E_5 group had nearly a "B" average while the C_5 group had just below a "C" average ($\underline{t} = 3.18$, $p < .01$).

Table 65

A Post First Grade[1] Comparison between the Experimental (E_5) and Control (C5) Groups on Mathematics Measures

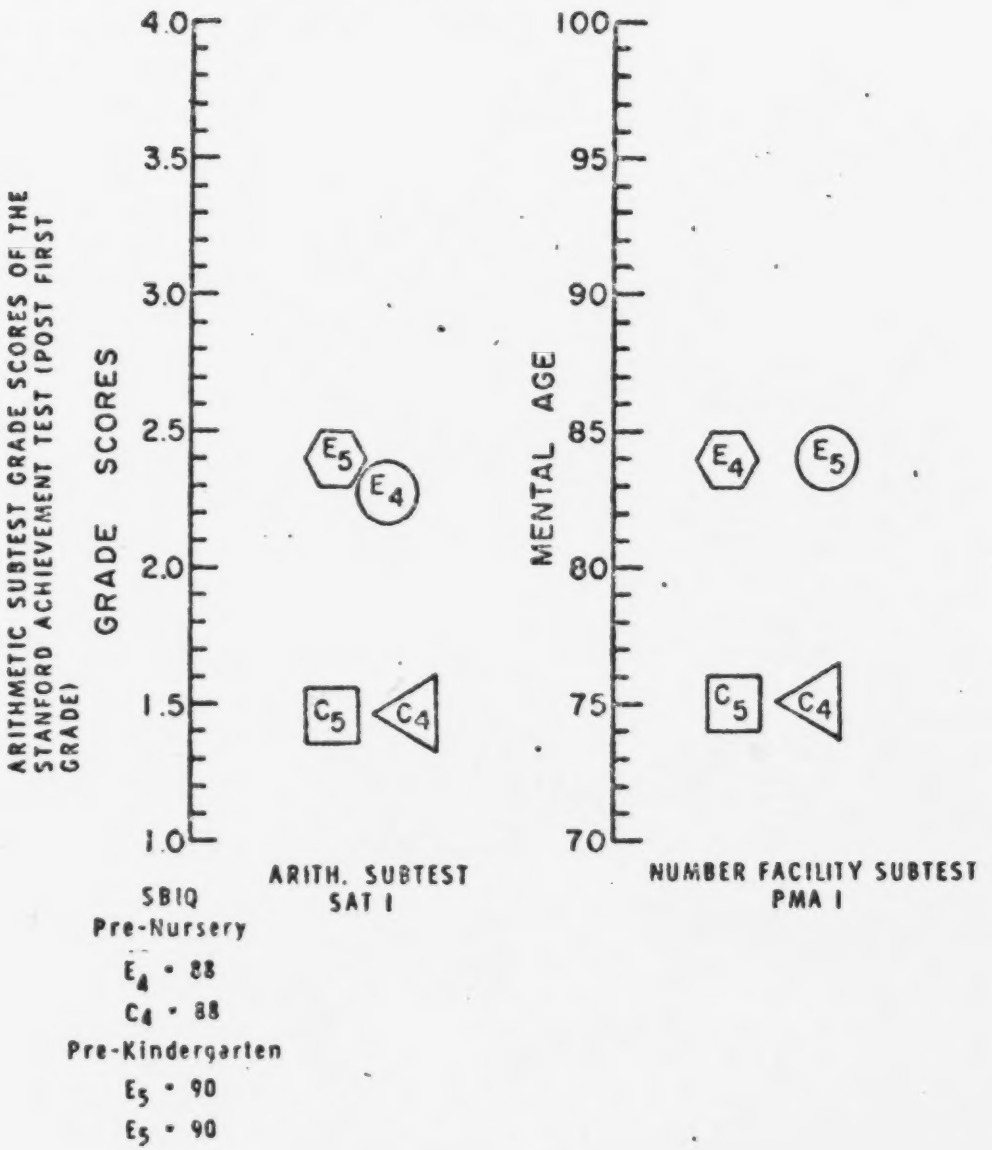
Measure	Grp.	N	YLTLP	POST FIRST GRADE			Diff. bet. Grps.	Grade level $\gtrless$ 1.9	t
				Grade Scores $\bar{X}$	SD				
SAT I Arithmetic	E_5	17	2	2.4	.46			+ .5	
	C_5	20	0	1.4	.56		1.0	- .5	5.72***
				Mental Ages				MA $\gtrless$ CA	
				CA (mths) $\bar{X}$	MA (mths) $\bar{X}$	SD			
PMA I Number Facility	E_5	17	2	83	84	8.8		+1	
	C_5	20	0	81	75	11.8	9	-6	2.80**

**p < .01 ***p < .001

[1]After 2 years of the LTLP

Figure 16

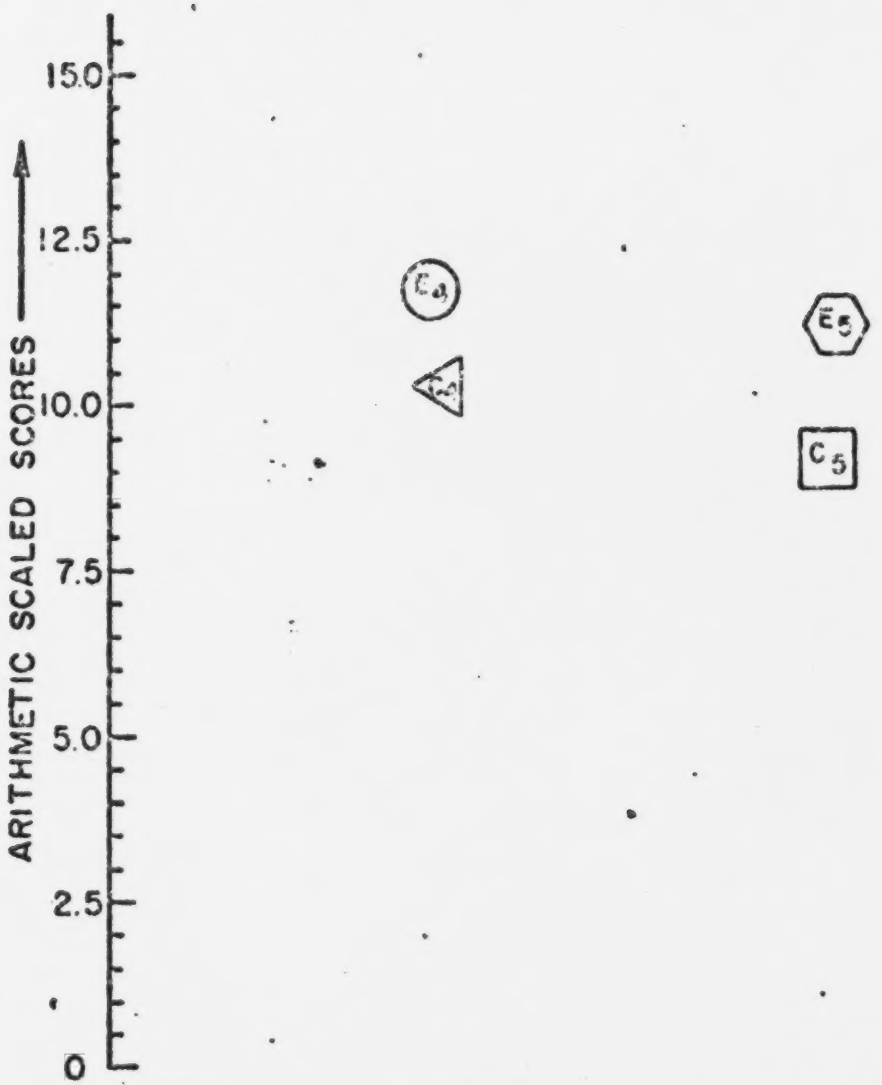
A POST FIRST GRADE COMPARISON BETWEEN THE EXPERIMENTAL (E_4, E_5) and CONTROL (C_4, C_5) GROUPS ON THE ARITHMETIC SUBTEST OF THE STANFORD ACHIEVEMENT TEST AND THE NUMBER FACILITY SUBTEST OF THE PRIMARY MENTAL ABILITIES I



SBIQ
Pre-Nursery
E_4 • 88
C_4 • 88
Pre-Kindergarten
E_5 • 90
E_5 • 90

FIGURE 17 99

A COMPARISON BETWEEN THE EXPERIMENTAL (E_4, E_5) AND CONTROL (C_4, C_5) GROUPS ON THE ARITHMETIC SUBTEST OF THE WISC



SBIQ
PRE-TESTING
PRE-KINDERGARTEN
E_5 = 90
C_5 = 90
PRE-NURSERY
E_4 = 88
C_4 = 88

ARITHMETIC SCALED SCORES POST 1st GRADE
E_4 = 11.5
C_4 = 10.0

ARITHMETIC SCALED SCORES POST 2nd GRADE (ONE YEAR AFTER TERMINATION OF LTLP)
E_5 = 11.0
C_5 = 9.0

Table 66

A Post First Grade[1] Comparison between the Experimental (E_5) and Control (C_5) Groups on the Mathematics Performance Measure

				POST FIRST GRADE				
Measure	Grp.	N	YLTLP	$\bar{X}$	SD	% Correct	Diff. bet. Grps.	t
Attempt. Arith. Problems	E_5	17	2	18.6	3.9			
	C_5	20	0	10.6	7.9		8.0	3.84***
Attempt. Arith. Prob. Accurate	E_5	17	2	17.1	4.6	92%		
	C_5	20	0	4.2	7.7	40%	12.9	6.06***
Addition Prob.	E_5	17	2	14.1	4.8			
	C_5	20	0	6.2	7.5		7.9	3.74***
Subtraction Problems	E_5	17	2	4.4	3.1			
	C_5	20	0	1.8	4.3		2.6	2.12*
Correct Math. Statement	E_5	17	2	17.5	4.3			
	C_5	20	0	5.2	8.4		12.3	5.43***
Number Reversals	E_5	17	2	0.0	0.0			
	C_5	20	0	0.6	0.6		- .6	-3.63***

*$p < .01$ ***$p < .001$

[1]After 2 years in the LTLP

Table 67

A Post Second Grade[1] Comparison between the Experimental (E_5) and Control (C_5) Groups on Mathematics Measures

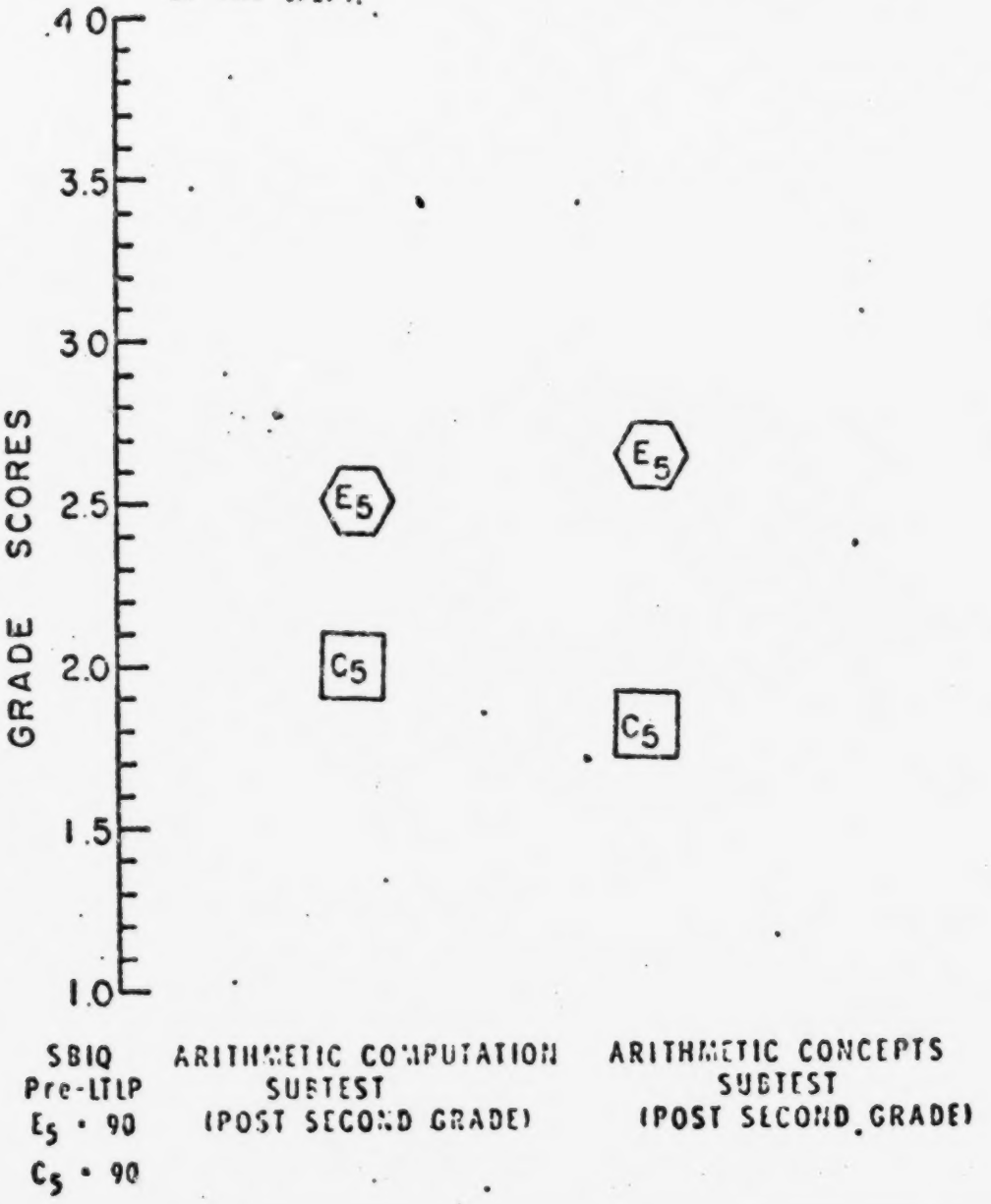
Measure	Grp.	N	YLTLP	YATLTLP	Scaled Scores X	Scaled Scores SD	Diff. bet. Grps.	S.S. ≷ 10	t
WISC Arithmetic	E_5	16	2	1	11.1	2.9		1.1	
	C_5	20	0	NA	8.9	2.0	2.2	-1.1	2.70*
					Grade Scores X	Grade Scores SD		Gr. Level ≷ 2.9	
SAT II Arith. Computation	E_5	15	2	1	2.5	.61		- .4	
	C_5	19	0	NA	2.0	.85	.5	- .9	2.11*
Arith. Concepts	E_5	15	2	1	2.6	.72		- .3	
	C_5	19	0	NA	1.7	.68	.9	-1.2	3.81***
					PMA Mental Age CA (mths) X	PMA Mental Age MA (mths) X	PMA Mental Age MA (mths) SD	MA ≷ CA	
PMA II Number Facility	E_5	15	2	1	94	98	8.3	+4	
	C_5	20	0	NA	93	85	10.4	-8	3.96***
					School Grades X		School Grades SD	Gr. ≷ "C" (2.0)	
School Grades Mathematics	E_5	16	2	1	2.8		.68	+ .8	
	C_5	19	0	NA	1.9		.88	- .1	3.18**

*p < .05 **p < .01 ***p < .001

[1]One year after termination of LTLP

FIGURE 18 102

A POST SECOND GRADE COMPARISON BETWEEN THE EXPERIMENTAL (E_5) and CONTROL (C_5) GROUPS ON THE ARITHMETIC SUBTESTS OF THE STANFORD ACHIEVEMENT TEST (ONE YEAR AFTER TERMINATION OF THE LTLP).



The mathematical performance comparison between the E_5 and C_5 groups could not be analyzed by parametric statistics due to the variability of the standard deviations of the experimental and control groups. The lack of 'Homogenity of Variance" violated one of the major assumptions for using t tests or analysis of variance. In many cases the standard deviations were greater than the means for the particular measure. Table 68 presents the medians, the means and SD's for the two groups. A descriptive comparison of this data is presented in Table 69.

The median distributions for the E_5 and C_5 groups are quite different for each of the mathematical functions taught in first and second grades, (addition, subtraction, greater and less than, and degree of accuracy). The E_5 group has more children than the control group who can perform the mathematical function of addition, subtraction, number of problems accurate, and greater and less than.

Table 68

Post Second Grade Medians, Means, and Standard Deviations of the Experimental (E_5) and Control (C_5) Groups on the Mathematics Performance Measures

		POST SECOND GRADE					
Measure	Grp.	N	YLTLP	YATLTLP	$\bar{X}$	SD	Median
Arith. Problems Attempted	E_5	17	2	1	20.0	6.9	16.5
	C_5	20	0	NA	19.8	22.0	12.5
Arith. Problems Accurate	E_5	17	2	1	17.4	7.7	16.5
	C_5	20	0	NA	17.1	21.0	10.5
Addition Problems	E_5	17	2	1	10.4	7.8	10.5
	C_5	20	0	NA	13.0	18.4	6.5
Subtraction Problems	E_5	17	2	1	4.7	3.6	4.5
	C_5	20	0	NA	3.9	8.2	.5
Multiplication Problems	E_5	17	2	1	0.5	1.5	
	C_5	20	0	NA	3.5	8.2	
Less or Greater Than Problems	E_5	17	2	1	0.2	0.5	
	C_5	20	0	NA	0.6	1.6	
Division Problems	E_5	17	2	1	3.8	4.3	2.5
	C_5	20	0	NA	1.6	4.4	$<.5$

The data presented in Table 69 indicates that in mathematical ability about 40% of the C_5 group fell below the lowest score of the E_5 group. Approximately 50% of the control group scored below 90% of the E_5 group in the amount of addition problems attempted, and approximately 35% of the C_5 group are not able to perform the mathematical function of addition. Only one child in the E_5 group was not able to perform subtraction problems whilel4 children in the C_5 group had this difficulty. Approximately 60% of the children in the E_5 group were able to perform the mathematical problems dealing with the concept of greater or less than while only 25% of the C_5 group could perform those function.

Division and multiplication are mathematical skills introduced in the third grade, and neither the E_5 or C_5 children as a group were able to perform these mathematical operations. These were introduced to set a ceiling for the mathematics performance measure for grade two and to get a baseline for next year's mathematics performance measures for both the E_5 and C_5 groups at the end of third grade.

Table 69

Post Second Grade Frequency Distribution between Experimental (E_5) and Control (C_5) Groups on Mathematics Performance

			POST SECOND GRADE																
			Number of Children Achieving the Following Raw Scores																
Measure	Grp.	N	0-1	2-3	4-5	6-7	8-9	10-11	12-13	14-15	16-17	18-19	20-21	22-23	24-25	26-27	28-29	30-31	>31
Arith. Prob. Attempted	E_5	17							2	2	5	3	2	1			1		2
	C_5	20	5			3			3	2	1			1					5
Arith. Prob. Accurate	E_5	17						2	1	3	3	3	1	2		1			1
	C_5	20	5		1	3		4	1	1									5
Addition Problems	E_5	17		1	2	3	2	3		1	1		1						1
	C_5	20	7	2		1	1		3	1	1				1	1			2
Subtraction Problems	E_5	17	1	7	4	2	1	1		1									
	C_5	20	14	2			1	1								2			
Multiplication Problems	E_5	17	16	1															
	C_5	20	18	1		1													
Division Problems	E_5	17	16	1															
	C_5	20	17	3															
Greater & Less Than Problems	E_5	17	7	2	3	1	1	2	1										
	C_5	20	15	3						1				1					

Table 70 and Figures 16 and 17 represent a post first grade comparison between the E_4 and C_4 groups on three measures of mathematical ability. On all three of the mathematics measures the E_4 group was statistically superior to their controls with p's ranging from .05 on the Arithmetic subtest of the WISC, to a p beyond the .001 level on the Arithmetic subtest of the SAT I. The results of all three measures, (reported in scaled scores, grade scores, or mental age months) reveal that the E_4 group's performance was above the midpoint, grade level, or chronological age respectively while the opposite was true for the control group.

When comparing the E_4 and C_4 groups on mathematical performance (Table 71) the E_4 group was statistically superior to the control children on all five subtest measures ($p < .05$ for addition problems to a p of .001 on the remaining four subtests). The C_4 group exhibited writing "number reversals" which was significant at the .05 level when compared to the E_4 group. The E_4 group did not have any children who had number reversals.

When comparing the experimental (E_4 vs E_5) and control (C_4 vs C_5) groups on mathematics performance at the end of first grade (Table 72) it becomes evident that no appreciable differences exist within the experimental and control groups. Only on one subtest , addition problems, was there a significant statistical difference ($p < .05$, $E_5 > E_4$) between the experimental groups. When making the same comparisons between the control (C_4 vs C_5) groups no statistical difference was found on the five mathematics subtests. Only on writing "number reversals" was there a difference statistically between the two control groups. ($p < .05$, $C_5 > C_4$).

Table 70

A Post First Grade[1] Comparison between the Experimental (E_4) and Control (C_4) Groups on Mathematics Measures

Measure	Grp.	N	YLTLP	POST FIRST GRADE		Diff. bet. Grps.		t
				Scaled Score			S.S. $\gtrless$ 10	
				$\bar{X}$	SD			
WISC	E_4	20	3	11.4	2.0		+1.4	
Arithmetic	C_4	17	0	9.8	1.9	1.6	- .2	2.40*
				Grade Score			Gr. Score $\gtrless$ 1.9	
				$\bar{X}$	SD			
SAT I	E_4	20	3	2.3	.27		+ .4	
Arithmetic	C_4	17	0	1.3	.28	1.0	- .6	10.28***
				Mental Age			MA $\gtrless$ CA	
				CA (mths) $\bar{X}$	MA (mths) $\bar{X}$	SD		
PMA I	E_4	20	3	82	84	7.3	+2	
Number Facility	C_4	13	0	81	85	9.3	-6	3.28**

*p $<$ .01 **p $<$ .05 ***p $<$ .001

[1] After three years of the LTLP

Table 71

A Post First Grade[1] Comparison between the Experimental (E_4) and Control (C_4) Groups on the Mathematics Performance Measure

				POST FIRST GRADE				
Measure	Grp.	N	YLTLP	$\bar{X}$	SD	% Correct	Diff. bet. Grps.	t
Attempt. Arith. Problems	E_4	20	3	17.5	7.1			
	C_4	18	0	8.7	7.8		8.8	3.74***
Attempt. Arith. Prob. Accurate	E_4	20	3	16.1	7.8	92%		
	C_4	18	0	5.3	6.6	61%	10.8	4.67***
Addition Prob.	E_4	20	3	10.5	4.8			
	C_4	18	0	5.8	6.1		4.7	2.70*
Subtraction Problems	E_4	20	3	5.5	3.0			
	C_4	18	0	2.8	3.8		2.7	2.44*
Correct Math. Statement	E_4	20	3	17.5	7.1			
	C_4	18	0	8.7	8.9		8.8	3.46***
Number Reversals	E_4	20	3	0.0	0.0			
	C_4	18	0	.2	0.0		-.2	-2.04*

*$p < .05$ ***$p < .001$

[1]After three years of the LTLP

122

Table 72

A Post First Grade Comparison between the Experimental (E_4 vs E_5) and between the Control (C_4 vs C_5) Groups on the Mathematics Performance Measure

			POST FIRST GRADE					
Measure	Grp.	N	YITLP	$\bar{X}$	SD	% Correct	Diff. bet. Grps.	t
Attempt. Arith. Problems	E_4	22	3	17.5	7.1			
	E_5	17	2	18.6	3.9		1.1	-0.60
	C_4	18	0	8.7	7.8			
	C_5	20	0	10.6	7.9		1.9	-0.72
Attempt. Arith. Prob. Accurate	E_4	22	3	16.1	7.8	92%		
	E_5	17	2	17.1	4.6	92%	1.0	-0.45
	C_4	18	0	5.3	6.6	61%		
	C_5	20	0	4.2	7.6	40%	1.1	0.46
Addition Prob.	E_4	22	3	10.5	4.8			
	E_5	17	2	14.1	4.8		3.6	-2.30*
	C_4	18	0	5.8	6.1			
	C_5	20	0	6.2	7.5		.4	-0.14
Subtraction Problems	E_4	22	3	5.2	3.0			
	E_5	17	2	4.4	3.1		.8	0.78
	C_4	18	0	2.8	3.8			
	C_5	20	0	1.8	4.3		1.0	.82
Correct Math. Statement	E_4	22	3	17.5	7.1			
	E_5	17	2	17.5	4.3		0	0.02
	C_4	18	0	8.7	8.9			
	C_5	20	0	5.2	8.4		3.5	1.27
Number Reversals	E_4	22	3	0.0	0.0			
	E_5	17	2	0.0	0.0		0	0.00
	C_4	18	0	0.2	0.4			
	C_5	20	0	0.6	0.6		.4	-2.30*

*p < .05

Teacher Ratings

Post kindergarten comparisons between the experimental (E_5) and control (C_5) groups on Teacher Ratings are presented in Table 73. Although none of the ratings reached statistical significance at the .05 level, the experimental children were rated higher than the control children on all six measures. A factor which may have affected the ratings somewhat is that the teachers of both the experimental and control groups rated all their children fairly high on the scale used. A copy of the rating scale is presented in the appendix.

Table 73

A Post Kindergarten[1] Comparison between the Experimental (E_5) and Control (C_5) Groups on Teacher Ratings

		POST KINDERGARTEN					
Measure	Grp.	N	YLTLP	TR		Diff. bet. Grps.	t
				$\bar{X}$	SD		
Teacher Ratings							
Effort	E_5	21	1	3.3	.76		
	C_5	21	0	2.8	1.05	.5	1.64
Persistence	E_5	21	1	2.9	.83		
	C_5	21	0	2.7	1.17	.2	0.59
Goal Directedness	E_5	21	1	3.0	.90		
	C_5	21	0	2.6	1.00	.4	1.26
Independence	E_5	21	1	2.8	.73		
	C_5	21	0	2.5	.96	.3	1.06
Fear of Failure	E_5	21	1	2.6	.66		
	C_5	21	0	2.3	.98	.3	1.08
Total	E_5	21	1	14.5	3.02		
	C_5	21	0	12.9	4.59	1.6	1.32

[1] After one year of the LTLP

Table 74 represents the post first grade comparisons between the E_5 and C_5 groups on Teacher Ratings. The C_5 group was rated significantly better on two of the five measures, (Independence and Fear of Failure), however, there was no significant difference between the two groups on the total measure.

Table 74

A Post First Grade[1] Comparison between the Experimental (E_5) and Control (C_5) Groups on Teacher Ratings

Measure	Grp.	N	YLTLP	TR		Diff. bet. Grps.	t
				$\bar{X}$	SD		
POST FIRST GRADE							
Teacher Ratings							
Effort	E_5	17	2	3.2	1.01		
	C_5	20	0	3.2	.99	0	0.80
Persistence	E_5	17	2	2.9	.78		
	C_5	20	0	3.2	1.01	.3	-1.08
Goal Directedness	E_5	17	2	2.7	.77		
	C_5	20	0	3.2	.99	.5	-1.53
Independence	E_5	17	2	2.5	.72		
	C_5	20	0	3.2	1.01	.7	-2.36*
Fear of Failure	E_5	17	2	2.4	.86		
	C_5	20	0	3.1	.22	.7	-3.24***
Total	E_5	17	2	13.7	3.44		
	C_5	20	0	15.8	3.99	2.1	-1.67

*$p < .05$ ***$p < .001$

[1] After two years in the LTLP

When making the post second grade comparison between the E_5 and C_5 group on Teacher Ratings the experimental group was again rated higher on all six of the ratings. Only the rating on Fear of Failure, however, reached significance ($t = 2.55$, $p < .01$).

Table 75

A Post Second Grade[1] Comparison between the Experimental (E_5) and Control (C_5) Groups on Teacher Rating

		POST SECOND GRADE						
Measure	Grp.	N	YLTLP	YATLTLP	Teacher Ratings		Diff. bet. Grps.	t
					$\bar{X}$	SD		
Teacher Ratings								
Effort	E_5	16	2	1	2.9	.80		
	C_5	19	0	NA	2.3	1.16	.6	1.63
Persistence	E_5	16	2	1	2.6	.96		
	C_5	19	0	NA	2.4	1.12	.2	0.57
Goal Directedness	E_5	16	2	1	2.6	.89		
	C_5	19	0	NA	2.2	1.11	.4	1.17
Independence	E_5	16	2	1	2.4	.81		
	C_5	19	0	NA	2.3	1.05	.1	0.35
Fear of Failure	E_5	16	2	1	2.6	.73		
	C_5	19	0	NA	1.9	.81	.7	2.55**
Total	E_5	16	2	1	13.0	3.78		
	C_5	19	0	NA	11.1	4.89	1.9	1.30

**$p < .01$

[1]One year after termination of the LTLP

The post kindergarten comparisons between the E_4 and C_4 groups on Teacher Ratings (Table 76) indicate that the E_4's scored significantly higher on Effort and Goal Directedness. On the other three Teacher Ratings the experimental children were also rated higher than their controls.

Table 76

A Post Kindergarten[1] Comparison between the Experimental (E_4) and Control (C_4) Groups on Teacher Ratings

		POST KINDERGARTEN					
Measure	Grp.	N	YLTLP	TR		Diff. bet. Grps.	t
				$\bar{X}$	SD		
Teacher Ratings							
Effort	E_4	22	2	3.3	.72		
	C_4	20	0	2.4	.82	.9	3.85***
Persistence	E_4	22	2	2.6	.85		
	C_4	20	0	2.3	.91	.3	1.25
Goal Directedness	E_4	22	2	3.1	.75		
	C_4	20	0	2.4	1.05	.7	2.44**
Independence	E_4	22	2	2.6	.80		
	C_4	20	0	2.3	.92	.3	0.92
Fear of Failure	E_4	22	2	2.5	.67		
	C_4	20	0	2.4	.81	.1	0.45
Total	E_4	22	2	14.0	2.97		
	C_4	20	0	11.7	4.33	2.3	1.95*

*$p < .05$ **$p < .01$ ***$p < .001$

[1] After two years of the LTLP

When comparing the E_4 and C_4 groups on Teacher Ratings at the end of first grade (Table 77) the E_4 group was rated significantly higher on four out of five ratings; Effort, Persistence, Goal Directedness, and Independence. Three of these ratings reached statistical significance beyond the .001 level. On total Teacher Ratings the E_4 group was also statistically superior to their C_4 controls at the .001 level. (t = 3.82).

Table 77

A Post First Grade[1] Comparison between the Experimental (E_4) and Control (C_4) Groups on Teacher Ratings

		POST FIRST GRADE					
Measure	Grp.	N	YLTLP	TR		Diff. bet. Grps.	t
				$\bar{X}$	SD		
Teacher Ratings							
Effort	E_4	20	3	3.2	.70		
	C_4	18	0	2.2	1.00	1.0	3.52***
Persistence	E_4	20	3	3.3	.79		
	C_4	18	0	2.2	.99	1.1	3.76***
Goal Directedness	E_4	20	3	3.3	.64		
	C_4	18	0	1.9	.68	1.4	6.38***
Independence	E_4	20	3	2.9	.72		
	C_4	18	0	2.1	.94	.8	3.14**
Fear of Failure	E_4	20	3	2.5	.95		
	C_4	18	0	2.3	1.02	.2	0.52
Total	E_4	20	3	14.9	3.30		
	C_4	18	0	10.7	3.53	4.2	3.82***

**p < .01 ***p < .001

[1]After three years of the LTLP

A post kindergarten comparison between the E_4 vs E_5 groups and between the C_4 vs C_5 groups on Teacher Ratings is presented in Table 78 . The results of this analysis indicate that there are no appreciable differences in the Teacher Ratings between the E_4 and E_5 groups. When comparing the two control groups on these ratings at the end of kindergarten no statistical difference is found either.

Table 78

A Post Kindergarten Comparison between the Experimental (E_4 vs E_5) Groups and between the Control (C_4 vs C_5) Groups on Teacher Ratings

		POST KINDERGARTEN					
Measure	Grp.	N	YLTLP	TR		Diff. bet. Grps.	t
				$\bar{X}$	SD		
Teacher Ratings Effort	E_4	22	2	3.3	.72	0	0.14
	E_5	21	1	3.3	.78		
	C_4	20	0	2.4	.82	.4	-1.16
	C_5	20	0	2.8	1.07		
Persistence	E_4	22	2	2.6	.85	.3	-1.02
	E_5	21	1	2.9	.85		
	C_4	20	0	2.3	.91	.3	-1.05
	C_5	20	0	2.6	1.19		
Goal Directedness	E_4	22	2	3.1	.75	.1	0.54
	E_5	21	1	3.0	.92		
	C_4	20	0	2.4	1.04	.1	-0.45
	C_5	20	0	2.5	1.05		
Independence	E_4	22	2	2.6	.80	.2	-1.12
	E_5	21	1	2.8	.75		
	C_4	20	0	2.3	.92	.2	-0.50
	C_5	20	0	2.5	.95		
Fear of Failure	E_4	22	2	2.5	.67	.1	-0.57
	E_5	21	1	2.6	.68		
	C_4	20	0	2.4	.81	.1	0.17
	C_5	20	0	2.3	1.03		
Total	E_4	22	2	14.0	2.97	.5	-0.56
	E_5	21	1	14.5	3.09		
	C_4	20	0	11.7	4.33	1.0	-0.66
	C_5	20	0	12.7	4.73		

When comparing the E_4 and E_5 groups on Teacher Ratings at the end of first grade only the rating on Goal Directedness reached significance ($t = 2.35$, $p < .01$). The E_4 group was superior to the E_5 group on that rating. On the other four ratings the E_4 group scores higher than the E_5. A somewhat surprising finding occurred when making the same comparison between the C_4 and C_5 groups. The C_5 group was rated significantly higher than the C_4 group on all ratings.

Table 79

A Post First Grade Comparison between the Experimental (E_4 vs E_5) Groups and between the Control (C_4 vs C_5) Groups on Teacher Ratings

		POST FIRST GRADE					
Measure	Grp.	N	YLTLP	TR		Diff. bet. Grps.	t
				$\bar{X}$	SD		
Teacher Ratings							
Effort	E_4	20	3	3.2	.70		
	E_5	17	2	3.2	1.01	0	0.08
	C_4	18	0	2.2	1.00		
	C_5	20	0	3.2	.99	1.0	-2.87**
Persistence	E_4	20	3	3.3	.79		
	E_5	17	2	2.9	.78	.4	1.42
	C_4	18	0	2.2	.99		
	C_5	20	0	3.2	1.00	1.0	-3.19**
Goal Directedness	E_4	20	3	3.3	.64		
	E_5	17	2	2.7	.77	.6	2.35**
	C_4	18	0	1.9	.68		
	C_5	20	0	3.2	.99	1.3	-4.54***
Independence	E_4	20	3	2.9	.72		
	E_5	17	2	2.5	.72	.4	1.57
	C_4	18	0	2.1	.94		
	C_5	20	0	3.2	1.01	.9	-3.62***
Fear of Failure	E_4	20	3	2.5	.95		
	E_5	17	2	2.4	.86	.1	0.49
	C_4	18	3	2.3	1.03		
	C_5	20	2	3.1	.22	.8	-3.04***
Total	E_4	20	3	14.9	3.30		
	E_5	17	2	13.7	3.44	1.2	1.05
	C_4	18	0	10.7	3.53		
	C_5	20	0	15.8	3.98	4.1	-4.14***

**p < .01 ***p < .001

A post second grade comparison between the E_5 and C_5 groups on School Grades is presented in Table 80. On all seven academic subject areas the E_5 children were graded significantly higher than the control children. The grade point average difference between the two groups ranged from six tenths to nine tenths of a letter grade. When comparing the two groups in five non-academic areas there was no significant difference in the grades received.

Table 80

A Post Second Grade[1] Comparison between the Experimental (E_5) and Control (C_5) Groups on School Grades[2]

		POST SECOND GRADE						
Measure	Grp.	N	YLTLP	YATLTLP	School Grades $\bar{X}$	SD	Diff. bet. Grps.	t
School Grades Reading	E_5	16	2	1	2.3	.58		
	C_5	19	0	NA	1.6	.77	.7	2.87**
Language	E_5	16	2	1	2.3	.70		
	C_5	19	0	NA	1.6	.90	.7	2.64**
Spelling	E_5	16	2	1	2.6	.63		
	C_5	18	0	NA	1.9	.90	.7	2.50*
Writing	E_5	16	2	1	2.9	.50		
	C_5	19	0	NA	2.3	.87	.6	2.48**
Social Science	E_5	16	2	1	2.6	.51		
	C_5	19	0	NA	2.0	.88	.6	2.25*
Science	E_5	16	2	1	2.6	.51		
	C_5	19	0	NA	1.9	.81	.7	2.85**
Mathematics	E_5	16	2	1	2.8	.68		
	C_5	19	0	NA	1.9	.88	.9	3.18**
Health & Safety	E_5	16	2	1	2.6	.63		
	C_5	19	0	NA	2.6	.77	0	-0.07
Physical Education	E_5	16	2	1	2.9	.44		
	C_5	19	0	NA	2.7	.87	.2	0.83
Music	E_5	16	2	1	2.8	.45		
	C_5	19	0	NA	2.7	.67	.1	0.33
Art	E_5	15	2	1	2.5	.52		
	C_5	19	0	NA	2.7	.82	.2	-0.62
Citizenship	E_5	15	2	1	2.5	.74		
	C_5	17	0	NA	2.1	1.11	.4	1.03

*p < .05 **p < .01

[1]One year after termination of LTLP

[2]Grades: A=4; B=3; C=2; D=1; F=0

Perceptual Motor

Bender Gestalt Test

Table 81 presents a post kindergarten comparison between the experimental (E_5) and control (C_5) groups on the Bender Gestalt. After one year of the Learning to Learn Program, the experimental group's performance on the Bender was statistically superior to that of the control group ($t = 3.54$, $p < .01$).

Table 81

A Post Kindergarten[1] Comparison between the Experimental (E_5) and Control (C_5) Groups on the Bender Gestalt

		POST KINDERGARTEN					
Measure	Grp.	N	YLTLP	Error Score		Diff. bet. Grps.	t
				$\bar{X}$	SD		
Bender Gestalt	E_5	21	1	12.0	2.8		
	C_5	21	0	16.5	4.9	4.5	-3.54**

**p . .01

[1]After one year of the LTLP

At the end of first grade (after two years in the Learning to Learn Program) the experimental children maintained a statistically significant superior performance on the Bender over the control children, although the difference was not as great. ($t = 2.12$, $p < .05$)

Table 82

A Post First Grade[1] Comparison between the Experimental (E_5) and Control (C_5) Groups on the Bender Gestalt

		POST FIRST GRADE					
Measure	Grp.	N	YLTLP	Error Score		Diff. bet. Grps.	t
				$\bar{X}$	SD		
Bender Gestalt	E_5	17	2	6.6	2.7		
	C_5	20	0	9.1	4.3	2.5	-2.12*

*p . .05

[1]After two years of the LTLP

One year after the termination of the Learning to Learn Program the E_5 children were still statistically superior to the controls on the Bender Gestalt. The error score difference between the two groups increased from 2.5 after first grade to 3, (Table 83).

Table 83

A Post Second Grade[1] Comparison between the Experimental (E_5) and Control (C_5) Groups on the Bender Gestalt

		POST SECOND GRADE						
Measure	Grp.	N	YLTLP	YATLTLP	Error Score		Diff. bet. Grps.	t
					$\bar{X}$	SD		
Bender Gestalt	E_5	17	2	1	5.1	2.4		
	C_5	20	0	NA	8.1	4.0	3.0	-2.61*

*$p < .05$

[1] One Year after termination of the LTLP

A longitudinal descriptive comparison between the E_5 and C_5 groups on the Bender Gestalt error scores is presented in Figure 19. The slopes of the error score decline over time for both groups is quite similar with the error score difference between the two groups fluctuating between 3 and 4.

Table 84 represents a post nursery school comparison between the experimental (E_4) and control (C_4) groups on the Bender Gestalt. After one year of the Learning to Learn Program for the E_4 group there is a statistically significant difference between the groups on the Bender Gestalt. ($t = -3.28$, $p < .01$).

Table 84

A Post Nursery School[1] Comparison between the Experimental (E_4) and Control (C_4) Groups on the Bender Gestalt

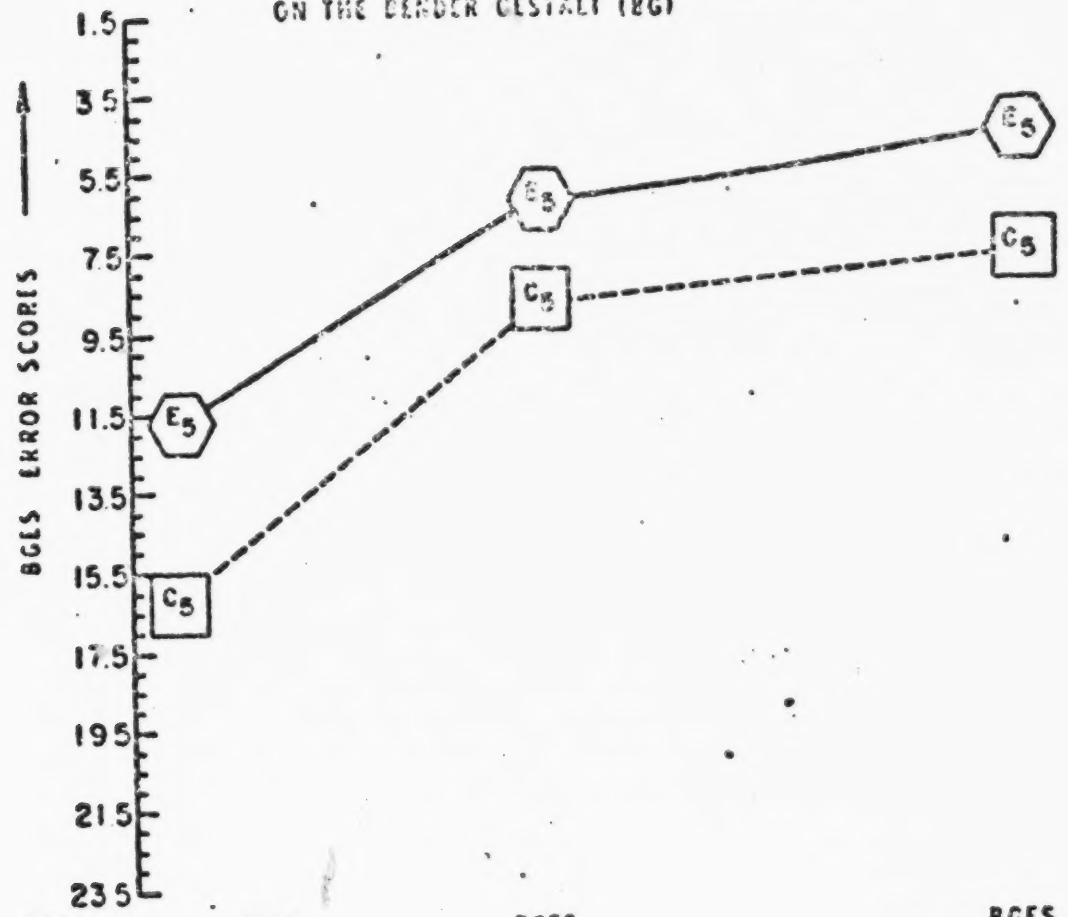
		POST NURSERY				Diff. bet. Grps.	t
Measure	Grp.	N	YLTLP	Error Score			
				$\bar{X}$	SD		
Bender Gestalt	E_4	23	1	16.5	3.7		
	C_4	21	0	21.1	5.3	4.6	-3.28**

**$p < .01$

[1] After one year of the LTLP

FIGURE 19 -- -- 120

A LONGITUDINAL COMPARISON BETWEEN THE EXPERIMENTAL (E_5) and CONTROL (C_5) GROUPS ON THE BENDER GESTALT (BG)



SBIQ Pre-Kinder	BGES Post-Kinder.	BGES Post 1st Grade	BGES Post 2nd Grade (1 yr. after termination of LTLP for E_5)
E_5 • 90	E_5 • 12	E_5 • 6	E_5 • 5
C_5 • 90	C_5 • 16	C_5 • 9	C_5 • 8

After two years in the Program (post kindergarten) the E_4 group increased their difference on the Bender Gestalt over the control children. The t between the two groups was -6.32 and the level of significance reached .001.

Table 85

A Post Kindergarten[1] Comparison between the Experimental (E_4) and Control (C_4) Groups on the Bender Gestalt

		POST KINDERGARTEN					
Measure	Grp.	N	YLTLP	Error Score		Diff. bet. Grps.	t
				$\bar{X}$	SD		
Bender Gestalt	E_4	22	2	10.0	2.6	5.3	-6.32***
	C_4	20	0	15.3	2.8		

***p <.001

[1]After two years of the LTLP

After three years (post first grade) the experimental group maintained their superiority on the Bender Gestalt over the controls. The mean error score difference between the two groups was 5.2 (t = -5.38). The level of significance of the difference between the two groups again reached the .001 level.

Table 86

A Post First Grade[1] Comparison between the Experimental (E_4) and Control (C_4) Groups on the Bender Gestalt

		POST FIRST GRADE					
Measure	Grp.	N	YLTLP	Error Score		Diff. bet. Grps.	t
				$\bar{X}$	SD		
Bender Gestalt	E_4	20	3	5.9	2.4	5.1	-5.38***
	C_4	18	0	11.0	3.4		

***p <.001

[1]After three years of the LTLP

Figure 20 is a descriptive comparison between the E_4 and C_4 groups over the three year period of the Learning to Learn Program. The slope of decline in the error score between the two groups appears very similar over the three year period.

Table 87 represents post kindergarten comparisons between the experimental (E_4 and E_5) groups and between the control (C_4 and C_5) groups on the Bender Gestalt. The performance of the E_4 group on the Bender Gestalt is significantly better when compared to that of the E_5 group ($t = -2.37$, $p < .05$). The error score difference between the two groups was 2.0. The comparison between the C_4 and C_5 groups on the Bender Gestalt indicates a small, non-significant difference between the two groups (mean error score difference between the groups = 1.2, $t = -.98$).

Table 87

A Post Kindergarten Comparison between the Experimental (E_4 and E_5) and Control (C_4 and C_5) Groups on the Bender Gestalt

		POST KINDERGARTEN					
Measure	Grp.	N	YLTLP	Error Score		Diff. bet. Grps.	t
				$\bar{X}$	SD		
Bender Gestalt	E_4	22	2	10.0	2.6		
	E_5	21	1	12.0	2.8	2.0	-2.37*
	C_4	20	0	15.3	2.8		
	C_5	21	0	16.5	4.9	1.2	- .98

*$p < .05$

When comparing the experimental (E_4 vs E_5) and the control (C_4 vs C_5) groups on the Bender Gestalt (post first grade) the results indicate no significant differences between the groups.

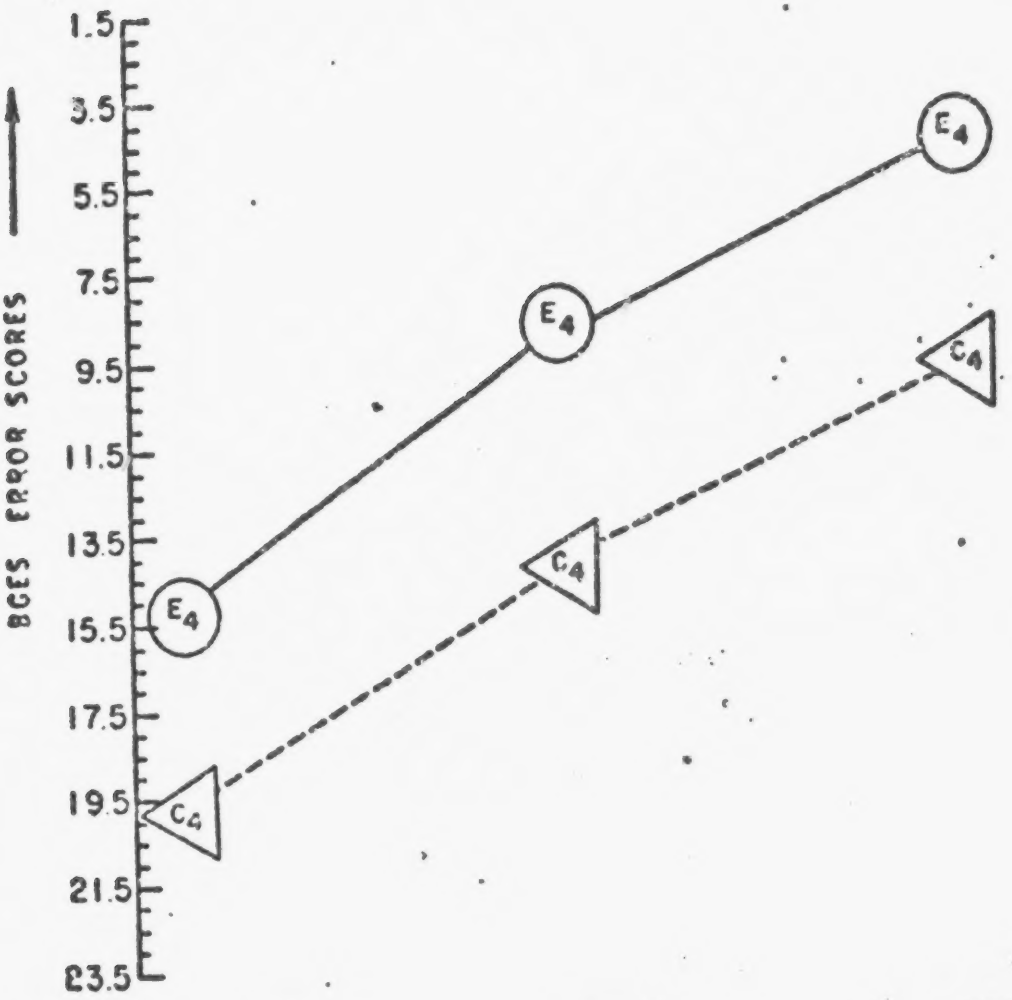
Table 88

A Post First Grade Comparison between the Experimental (E_4 and E_5) and Controls (C_4 and C_5) Groups on the Bender Gestalt

		POST FIRST GRADE					
Measure	Grp.	N	YLTLP	Error Score		Diff. bet. Grps.	t
				$\bar{X}$	SD		
Bender Gestalt	E_4	20	3	5.9	2.4		
	E_5	17	2	6.6	2.7	.7	-0.88
	C_4	18	0	11.0	3.4		
	C_5	20	0	9.1	4.3	1.9	1.53

FIGURE 20 123

A LONGITUDINAL COMPARISON BETWEEN THE EXPERIMENTAL (E_4) and CONTROL (C_4) GROUPS ON THE BENDER GESTALT



SBIQ Pre-Nursery	BGES Post-Nursery	BGES Post-Kind.	BGES Post 1st Grade
E_4 • 88	E_4 • 16	E_4 • 10	E_4 • 6
C_4 • 88	C_4 • 21	C_4 • 15	C_4 • 11

Personality

I See Me Feel Test

The I See Me Feel Test, designed to measure self concept, consists of forty school related pictorial situations. Beneath each picture are five faces depicting five different emotional states. (sad face = #1; smiling face = #5). The child is presented the picture and asked to point to the face that represents how he feels about the situations.

Table 89 represents a post second grade comparison between the E_5 and C_5 groups on the I See Me Feel Test. The results indicate that both groups are at a high level of self concept as measured by this scale. Both groups show positive attitudes toward school and educational situations.

Table 89

A Post Second Grade Comparison between the E_5 and C_5 Groups on the I See Me Feel Self Concept Test

		POST SECOND GRADE						
Measure	Grp.	N	YLTLP	YATLTLP	Total Raw Score* $\bar{X}$	SD	Mean Response per Picture**	t
I See Me Feel								
	E_5	14	2	1	165.9	10.3	4.6	
	C_5	19	0	NA	158.8	35.1	4.0	0.72

* Maximum raw score = 200
** Maximum response per picture = 5

A post first grade comparison between the E_4 and C_4 groups on the I See Me Feel Self Concept Test is presented in Table 90 . The post first grade comparison between the E_4 and C_4 children on self concept attitudes toward educational situations indicates that the two groups responses were essentially the same and are at a high level just as was true for the older two groups.

Table 90

A Post First Grade Comparison between the E_4 and C_4 Groups on the I See Me Feel Self Concept Test

		POST FIRST GRADE				
Measure	Grp.	N	YLTLP	Total Raw Score* $\bar{X}$	SD	Mean Response per Picture**	t
I See Me Feel							
	E_4	20	3	158.8	30.1	4.0	
	C_4	18	0	158.1	21.7	4.0	0.87

* Maximum raw score = 200
** Maximum response per picture = 5

Rosenzweig Picture Frustration Test

Table 91 represents a post second grade comparison between the E_5 and C_5 groups on the Rosenzweig Picture Frustration Test. A description of this measure and the scoring criteria is included in the Appendix.

Table 91

A Post Second Grade Comparison between the E_5 and C_5 Groups on the Rosenzweig Picture Frustration Test

			POST SECOND GRADE						
Measure	Grp.	N	YLTLP	YATLTLP	% Within Norms	% Above 1 SD	% Below 1 SD	6 & 7 Yr. Level Standard Norms $\bar{X}$	SD
Rosenzweig Sub Measures									
E	E_5	16	2	1	44	44	12		
	C_5	18	0	NA	50	28	22	52.5	15.4
I	E_5	16	2	1	31	13	56		
	C_5	18	0	NA	50	0	50	22.9	7.0
M	E_5	16	2	1	25	19	56		
	C_5	18	0	NA	22	39	39	24.6	11.4
O-D	E_5	16	2	1	56	31	13		
	C_5	18	0	NA	39	33	28	17.5	7.0
E-D	E_5	16	2	1	50	31	19		
	C_5	18	0	NA	61	6	33	59.6	12.3
N-P	E_5	16	2	1	31	13	56		
	C_5	18	0	NA	61	11	28	22.9	11.3
GCR	E_5	16	2	1	94	6	0		
	C_5	18	0	NA	78	6	16	60.0	9.9

The majority of children from both the experimental and control groups direct their aggression toward the environment or toward themselves when dealing with a frustrating situation. The types of reaction they use in response to frustrating situations are aimed at the causitive factors involved in the frustrating situation and how the person feels about the situation he is in (i.e., I am mad ; You hurt me; I feel bad.) The group conformity ratings for both groups were quite high, which is similar to the modal response to each item given by a normal sample of the population.

Descriptive Data

Tables 92 and 93 represent descriptive data obtained from parent questionnaires sent to parents of the E_4, E_5, C_4, C_5 children.

Table 92 presents the post first grade parental ratings of their children's academic behavior. It is interesting to note that the E_5 and E_4 parents return rate for the questionnaire was 88% and 95% compared to 60% and 50% for the C_5 and C_4 groups.

In relation to questions 1, 2, 4, and 6 the parents of experimental children rate their children as doing more schoolwork at home, bringing more books home to read, and doing more arithmetic problems than do parents of the control children.

The E_4 and E_5 parents get information about their children by a variety of means (question 3); making use of Parent-Teacher conferences, phone calls, PTA meetings, and work the child brings home. The parents of the control children rely mostly on report cards and work brought home, therefore, parental involvement with the teachers and school is at a minimum for these parents. The majority of the parents from all groups feel that Reading is the most important subject a child should learn in school (question 5).

One year after termination of the Learning to Learn Program (post second grade, Table 93) the same questionnaire was administered to the parents of the E_5 and C_5 children. Similar to the previous year's results the number of respondents for the E_5 group exceeded that of the C_5 group. In relation to questions 2, 4, and 6 the E_5 children do more schoolwork at home, and bring more books home to read. The E_5 and C_5 children now do about the same amount of arithmetic problems at home (question 6). The E_5 and C_5 parents now use similar procedures to obtain information about their children employing several approaches (question 3). Both groups of parents still feel that reading is the most important academic subject (question 5).

Table 92

A Post First Grade Comparison between the Experimental (E_4 and E_5) and Control (C_4 and C_5) Groups on Parental Rating of Children's Academic Behavior

	E_4	E_5	C_4	C_5
1. Number respondents	$\frac{20}{21}$ 95%	$\frac{15}{17}$ 88%	$\frac{10}{20}$ 50%	$\frac{12}{20}$ 60%
2. How often does your first grader do schoolwork at home?				
3 or more times a week	18	15	4	5
once a week	2	0	5	4
2 or 3 times a month	0	0	0	3
3. How do you get information about how your child is doing in first grade?*				
report card	0	0	6	9
PT conference	7	14	4	5
phone calls	0	3	0	1
PTA meetings	2	5	0	1
work he brings home	8	12	4	7
4. How often does your first grader bring books home from school to read to you?				
3 or more times a week	17	7	1	3
once a week	2	8	5	3
2 - 3 times a month	0	0	0	6
never	0	0	2	0
not sure	0	-	2	1
5. What do you feel is the most important subject a child should learn in school?				
reading	17	11	9	10
writing	0	1	1	0
language	0	1	0	1
arithmetic	2	1	0	0
science	0	1	0	0
history	0	0	0	1
6. How often does your first grader do arithmetic problems at home?				
3 or more times a week	20	14	9	3
once a week	0	0	0	4
2 - 3 times a month	0	1	1	2
never	0	0	0	1
not sure	0	0	0	2

*parent could answer more than one.

Table 93

A Post Second Grade Comparison between the Experimental (E_5) and Control (C_5) Groups on Parental Ratings of Children's Academic Behavior

	E_5	C_5
1. Number respondents	13/17 76%	11/20 55%
2. How often does your second grader do schoolwork at home?		
3 or more times a week	6	4
about once a week	4	6
2 - 3 times a week	2	0
never	0	1
not sure	1	0
3. How do you get information about how your child is doing in the second grade?		
report card	12	9
PT conference	2	5
phone calls	2	1
PTA meetings	3	1
work he brings home	9	6
4. How often does your second grader bring books home from school to read to you?		
3 or more times a week	8	3
once a week	2	6
2 - 3 times a month	2	0
never	0	2
not sure	0	0
5. What do you feel is the most important subject a child should learn in school?		
reading	9	8
writing	0	1
language	0	1
arithmetic	2	0
science	0	1
history	0	0
6. How often does your second grader do arithmetic problems at home?		
3 or more times a week	13	10
once a week	0	1
2 - 3 times a month	0	0
never	0	0
not sure	0	0

Subgroup Analysis of Intellectual Gain over time based on Pre-Program - Stanford Binet IQ.

This section is devoted to descriptive comparisons between subgroups of the experimental and control groups on Stanford Binet IQ gain over time. The experimental and control groups were divided into thirds based on pre-program Stanford Binet IQ's. Descriptive analyses were performed in order to investigate the intellectual growth patterns of subgroups of children who were at different IQ levels when they began. In other words, we wanted to determine what differential effects exposure to the experimental or control programs had on children who were relatively bright or relatively dull intellectually.

Figures 21, 22 and 23 represent the experimental and control groups divided into upper, middle, and lower one-third subgroups based on pre-program Stanford Binet IQ. Most of the pre-program SBIQ's of comparable subgroups, i.e., E_4U_1 vs C_4U_1, E_5M vs C_5M, etc., are quite similar. The E_4L_1, C_4L_1, E_5L_1 and C_5L_1 subgroups comparison has the greatest discrepancies, with the E_4L_1 subgroup approximately 5 - 7 IQ points below the other lower one-third subgroups.

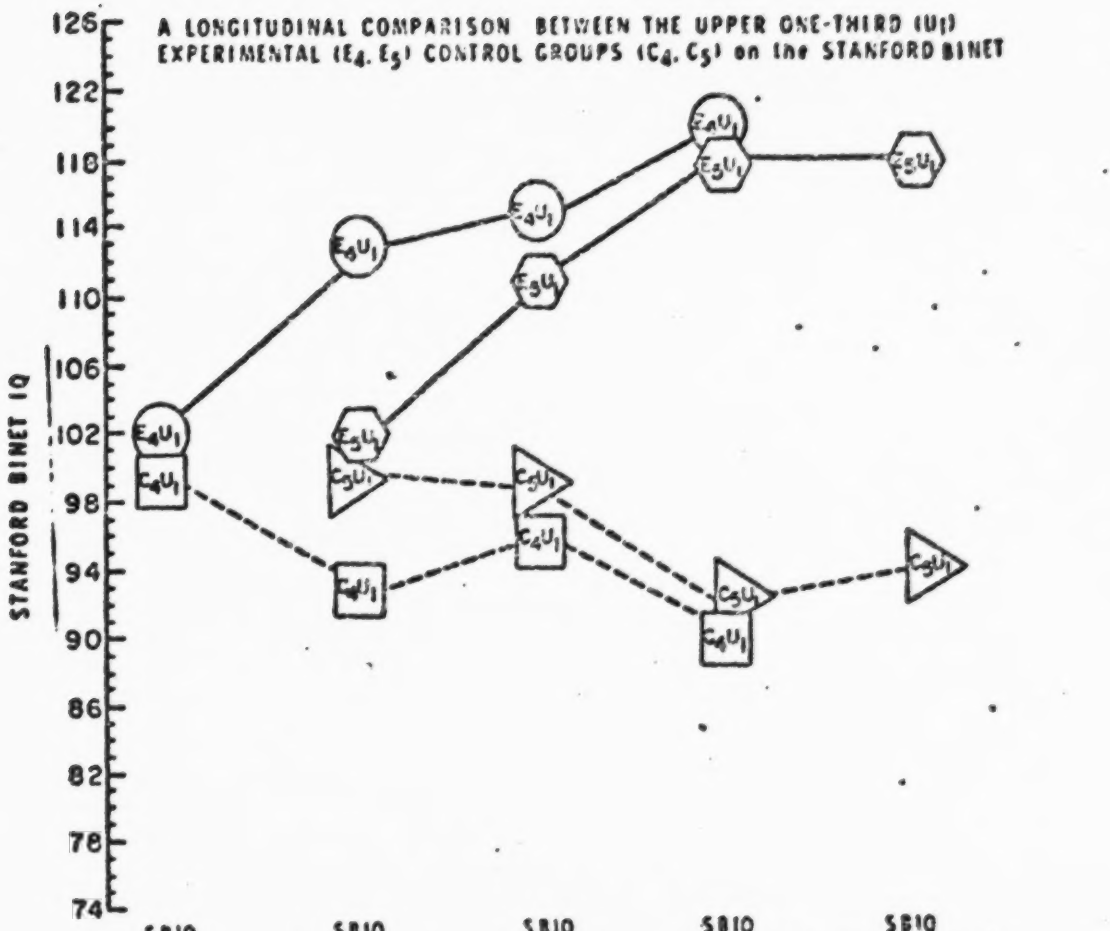
All three E_4 subgroups (E_4U_1, E_4M_1, E_4L_1) exhibited large gains in SBIQ after three years in the Learning to Learn Program. The subgroup with the lowest pre-program SBIQ (E_4L_1) responded with the largest gain of 24 IQ points. The upper (E_4U_1) and middle (E_4M_1) thirds of the E_4 group made approximately equal gains of 18 and 19 SBIQ points respectively. The developmental patterns of the E_4M_1 and E_4L_1 subgroups were similar with both groups making their largest SBIQ gain during the first year of the Learning to Learn Program and maintaining most of that gain for the remaining two years. The E_4U_1 subgroup's pattern of intellectual development indicates continuing gains after each year of the Learning to Learn Program with increases in SBIQ of 11, 2, and 5 points.

The E_5 group, who participated in the Learning to Learn Program for two years, were also divided into upper, middle, and lower one-third subgroups (E_5U_1, E_5M_1, E_5L_1). They showed different developmental patterns than the E_4 subgroups. The E_5U_1 and E_5M_1 subgroups made approximately equal IQ gains and had similar developmental patterns during their two years in the Learning to Learn Program. One year after termination of the Learning to Learn Program the E_5U_1 maintained their intellectual level while the E_5M_1 subgroup declined eight IQ points. The E_5L_1 subgroup's over-all intellectual gain of 8 IQ points did not match the other experimental groups; especially when making direct comparisons to the E_4L_1 subgroup's IQ gain of 24 points. It did, however, closely resemble the developmental patterns of the lower one-third control groups (C_4L_1 and C_5L_1).

The control groups were also divided into upper, middle, and lower one-third subgroups to ascertain the effects and impact of traditional educational programs on children with different levels of intelligence.

The upper one-third control subgroups (C_4U_1 and C_5U_1) exhibited similar IQ declines (8 and 9 IQ points) and developmental patterns at the end of first grade. It should be pointed out that these two control subgroups were of equal intellectual ability (based on pre program SBIQ) to the experimental E_4 and E_5 upper one-third subgroups. Thus after first grade the difference between the experimental and control upper one-third subgroups is approximately 29 IQ points. The middle one-third control subgroups (C_4M_1 and C_5M_1) display different intellectual development patterns. The C_4M_1 subgroup gained IQ points, while the C_5M_1 subgroup declined by the end of first grade. The C_4M_1 subgroup has the benefit of one year of preschool whereas the C_5M_1 has not. When comparing the experimental and control middle one-third subgroups, E_4M_1 and E_5M_1 gained 21 and 20 IQ points compared to a gain of 7 for C_4M_1 and a decline of 3 for C_5M_1. The lower one-third control subgroups (C_4L_1 and C_5L_1) exhibit similar developmental intellectual patterns with the IQ of the C_4L_1 being slightly higher. The intellectual level of functioning of both these subgroups however is in the "low average" and "borderline defective" classification.

FIGURE 21 131



SBIQ Pre-Nursery	SBIQ Post-Nursery	SBIQ Post-Kind.	SBIQ Post-1st Grade	SBIQ Post 2nd Grade (1yr. after termination of LTLP)
E_4U_1 • 101	E_4U_1 • 112	E_4U_1 • 114	E_4U_1 • 110	E_5U_1 • 117
C_4U_1 • 99	C_4U_1 • 92	C_4U_1 • 95	C_4U_1 • 90	C_5U_1 • 93
	Pre-Kind.	E_5U_1 • 110	E_5U_1 • 119	
	E_5U_1 • 100	C_5U_1 • 98	C_5U_1 • 91	
	C_5U_1 • 99			

A LONGITUDINAL COMPARISON BETWEEN THE MIDDLE ONE-THIRD (M1) EXPERIMENTAL (E_4, E_5) and CONTROL (C_4, C_5) GROUPS ON THE STANFORD BINET

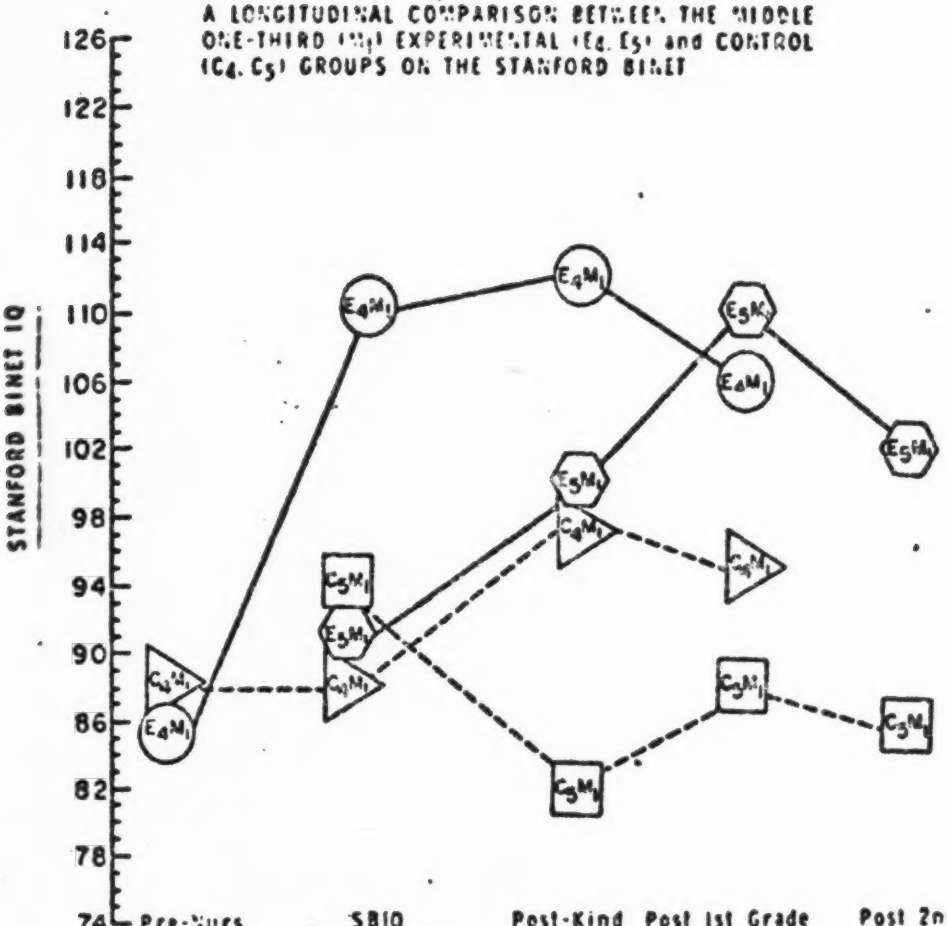
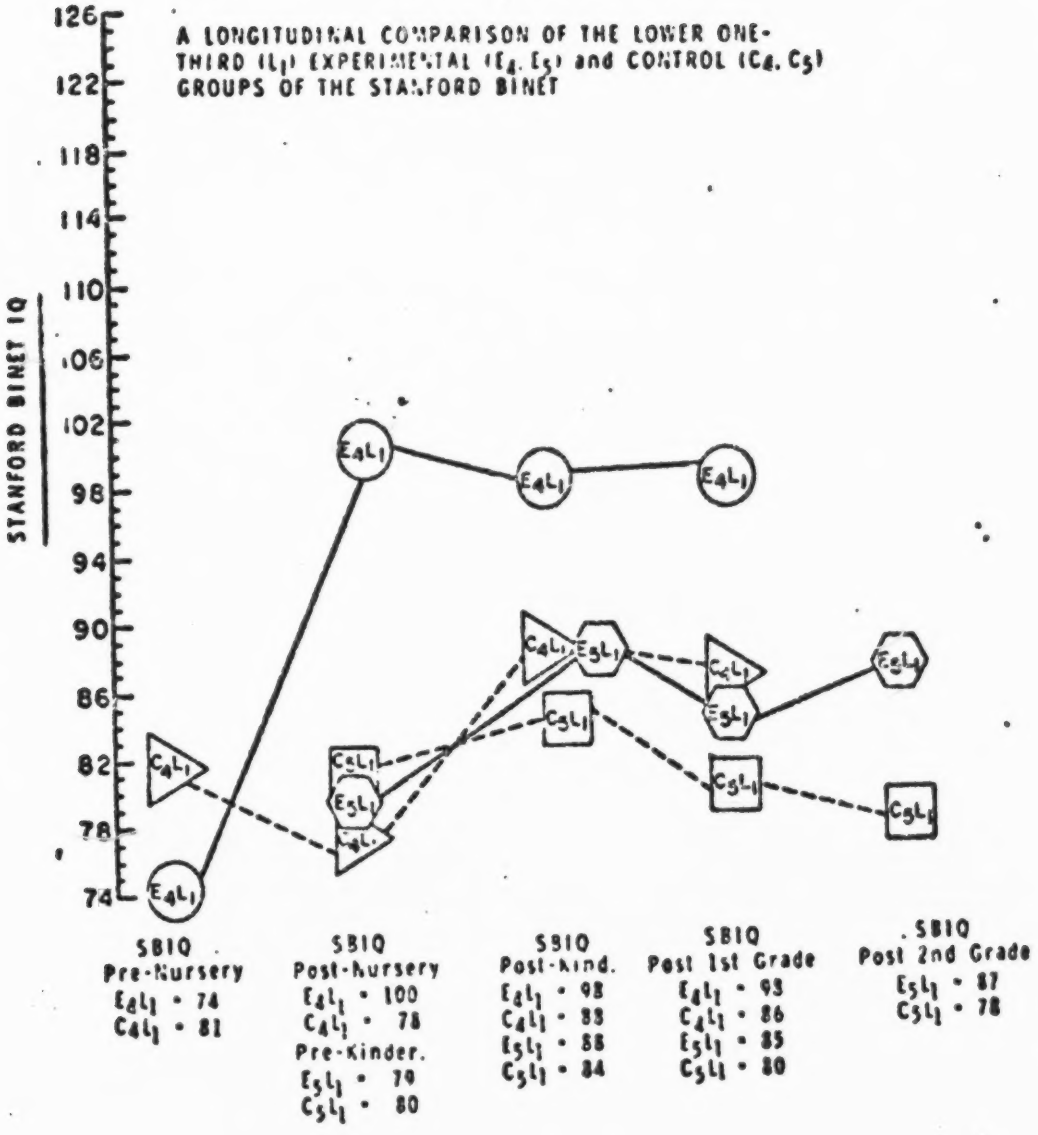


FIGURE 23 133

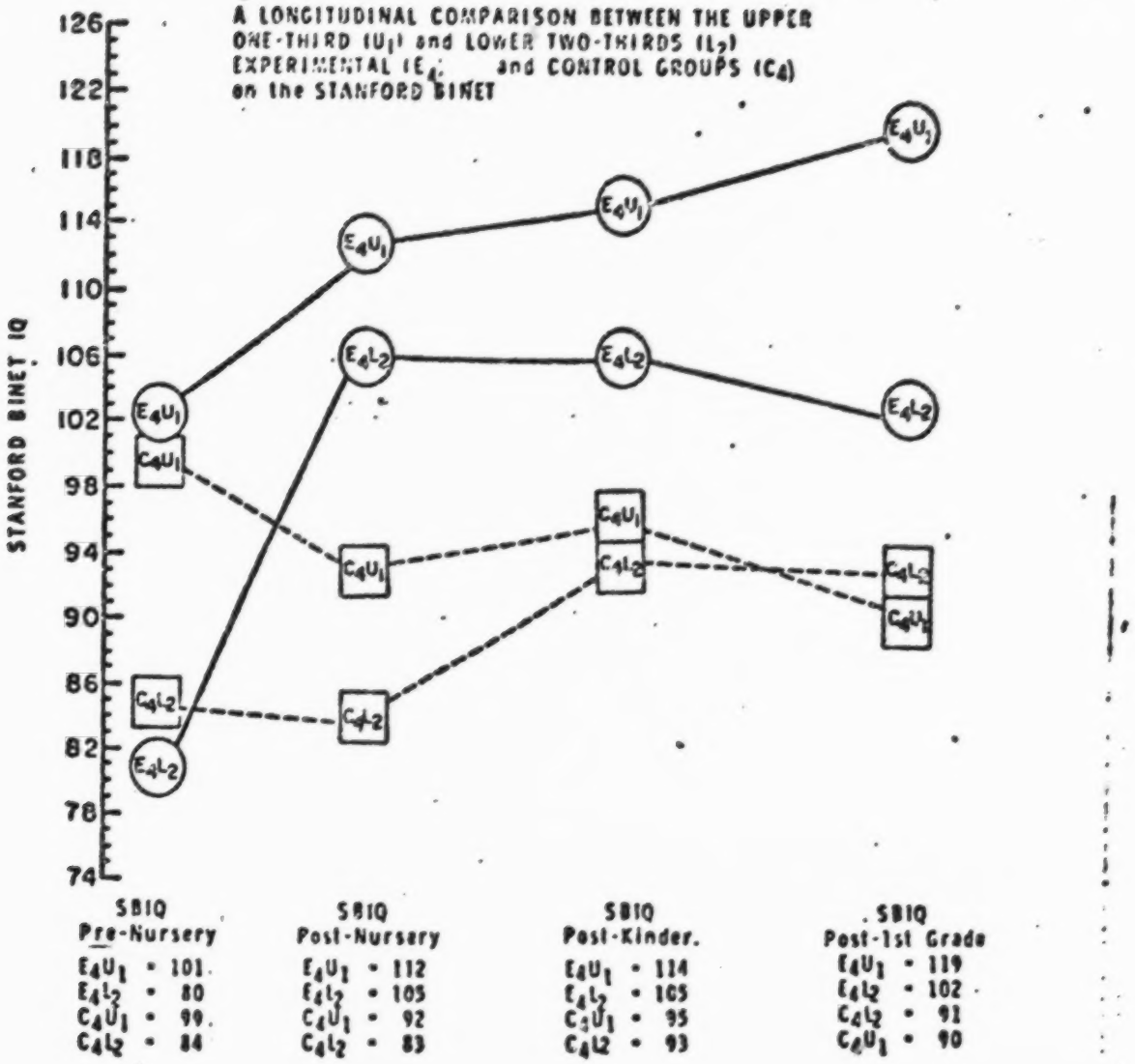
A LONGITUDINAL COMPARISON OF THE LOWER ONE-THIRD (L_1) EXPERIMENTAL (E_4, E_5) and CONTROL (C_4, C_5) GROUPS OF THE STANFORD BINET



Figures 24 and 25 represent the combining of the experimental and control middle one-third and lower one-third subgroups into a lower two-thirds subgroup (E_4L_2, E_5L_2, C_4L_2, C_5L_2). The pre-program SBIQ means of these subgroups fall into the "low average" range of intelligence. The E_4L_2 sugroup made the largest intellectual gain by the end of three years of the Learning to Learn Program(25 IQ points), while the E_5L_2 subgroup gained 12 IO points. The major treatment difference between these experimental suogroups was an additional year in the Learning to Learn Program for the E_4L_2 group at age four. The control lower two-thirds subgroups displayed different developmental trends. The C_5L_2 subgroup pattern remained at a low level,gradually dropping 4 IQ points after three years of traditional education. The C_4L_2 subgroup increased about 7 IQ points by the end of first grade. This subgroup had the benefit of one year of day care preschool which the C_5L_2 subgroup did not have. It is interesting to point out that prior to the Learning to learn Program there was a 15 IQ point difference between the C_4U_1 and C_4L_2 subgroups and at the end of first grade their IQ's were essentially the same.

In summary, the traditional educational programs did not help the control children improve their intellectual functioning. This is especially apparent concerning those children who have normal intelligence at ages 4 and 5. These children show a gradual decline in intelligence over time (see Figure 21). Children classified in the "low average" range of intelligence increase their intellectual ability slightly when they are exposed to traditional educational programs beginning at age 4. The children in the "low average" range of intelligence who were exposed to three years of traditional programs beginning at age five show no increases in their intellectual functioning. The opposite was true for those children who participated in the Learning to Learn Program. The groups of children who started the program in the "average" range of intelligence are in the upper limits of the "high average" range of intelligence by the end of first and second grades. The children who started the Learning to Learn Program at age 5 (E_5L_2) in the "low average" range are in the "average" range of intelligence by the end of the second grade. They, however, did not benefit as much from the Learning to Learn Program as those children who started at age 4 (E_4L_2) and were classified in the "borderline defective" range. These children progressed into the "normal" range of intelligence after three years in the Learning to Learn Program.

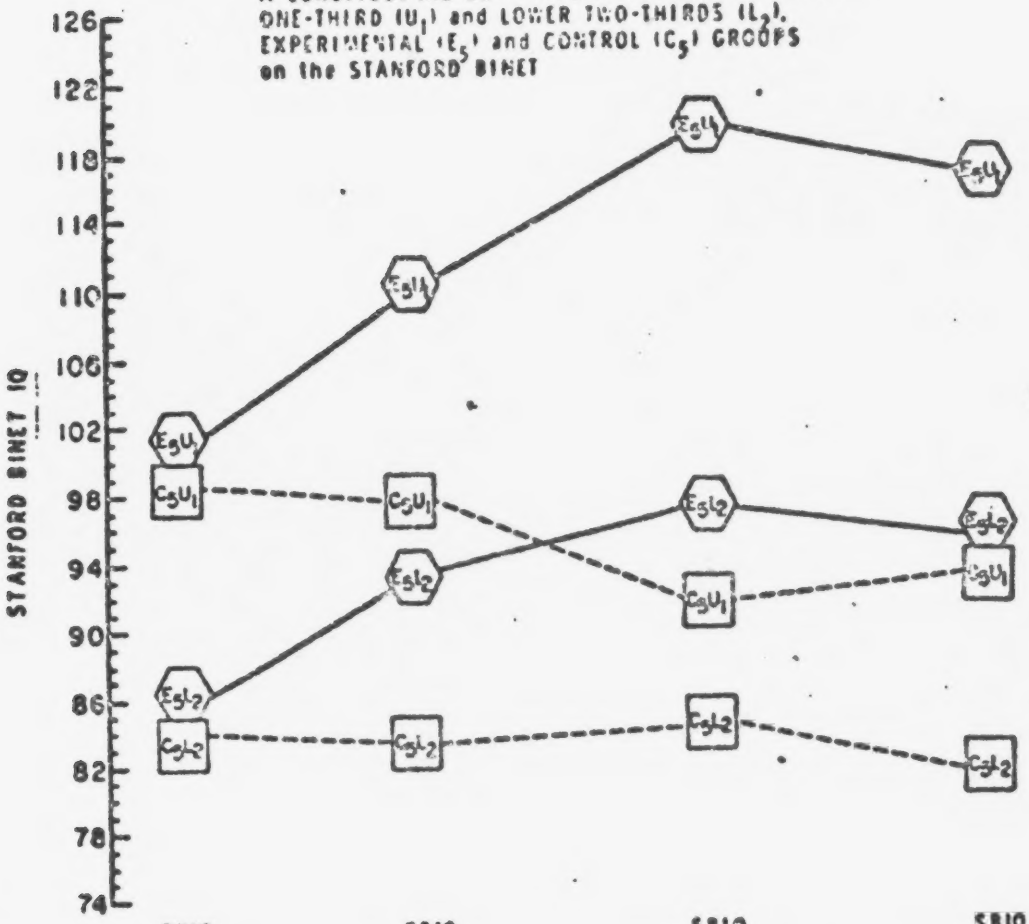
FIGURE 24 135



SBIQ Pre-Nursery	SBIQ Post-Nursery	SBIQ Post-Kinder.	SBIQ Post-1st Grade
E_4U_1 • 101	E_4U_1 • 112	E_4U_1 • 114	E_4U_1 • 119
E_4L_2 • 80	E_4L_2 • 105	E_4L_2 • 105	E_4L_2 • 102
C_4U_1 • 99	C_4U_1 • 92	C_4U_1 • 95	C_4L_2 • 91
C_4L_2 • 84	C_4L_2 • 83	C_4L_2 • 93	C_4U_1 • 90

FIGURE 25 136

A LONGITUDINAL COMPARISON BETWEEN THE UPPER ONE-THIRD (U_1) and LOWER TWO-THIRDS (L_2), EXPERIMENTAL (E_5) and CONTROL (C_5) GROUPS on the STANFORD BINET



SBIQ Pre-Kinder.	SBIQ Post-Kinder.	SBIQ Post-1st Grade	SBIQ Post-2nd Grade (One year after termination of LTLP)
E_5U_1 - 100	E_5U_1 - 110	E_5U_1 - 119	E_5U_1 - 117
C_5U_1 - 99	C_5U_1 - 98	E_5L_2 - 97	E_5L_2 - 95
E_5L_2 - 85	E_5L_2 - 93	C_5U_1 - 91	C_5U_1 - 93
C_5L_2 - 85	C_5L_2 - 83	C_5L_2 - 84	C_5L_2 - 81

Discussion

The results of this study indicate that the children who participated in the Learning to Learn Program made significantly greater developmental gains over the two and three year period they participated in the experimental program, than those children who attended and participated in traditional educational programs. Both experimental groups (E_4 after three years of the Learning to Learn Program, and E_5 one year after termination of the Learning to Learn Program preceded by two years participation in the Learning to Learn Program) were functioning in the upper limits of the "Average" range of intelligence, with a percentile rank on the Stanford Binet of 64 for those who began at age four (E_4) and 59 for those who began at age five. When comparing the E_4 and E_5 groups to the Negro standardization sample of the Binet their percentile ranks were at the 96th and 97th percentile levels respectively.

The level of functioning of the two matched control groups was in the "Low Average" range for the C_5 group and the lower limit of the "Average" range of intelligence for the C_4 group with percentile ranks on the Stanford Binet of 19 and 25, respectively. Both experimental groups moved from a mental age lower than their chronological age to one greater than it after their participation in the Learning to Learn Program. This did not occur with the control groups.

One of the most significant aims of this project is to determine and evaluate the effects of exposing groups of culturally deprived children to different lengths of specialized sequential educational programs.

The evaluation of the intellectual gains of the experimental groups over time on the Stanford Binet revealed different developmental patterns for the children who began at age four (E_4) and those who began at age five (E_5). The major intellectual gains for the E_4 group occurred during the first year of the experimental program when they gained nearly 20 IQ points. During the second and third years of the program the E_4 group maintained their gains in intellectual functioning.

The intellectual gains of the children who began the program at age five (E_5) showed a different pattern. After both the first and second years of the experimental sequential learning program the E_5 group displayed significant intellectual growth, with relatively equal IQ gain during each year of the program. (9.10 IQ gain 1st year; 7.37 IQ gain 2nd year). One year after termination of the Learning to Learn Program (post second grade) the E_5 group maintained the intellectual gains they achieved during the program.

Since intelligence test scores usually correlate highly with performance in academic courses, general school achievement, and later vocational success, two additional intellectual measures were given (WISC Verbal Scales and PMA) in order to obtain a reliable and valid indication of the intellectual functioning of these children. The experimental children scored in the "Average" range of intelligence and above the 50th percentile rank on WISC Verbal Scales. The control groups were between the 20th and 25th percentile rank with the C_5 group in the "Dull Normal" range of intelligence and the C_4

group in the lower limits of the "Average" range of intelligence. One year after termination of the Learning to Learn Program the E_5 group achieved a deviation IQ on the PMA II which was 22 points higher than their controls.

It is apparent that the experimental program enhanced the intellectual development of the disadvantaged children who participated in it and that the traditional educational programs of the control groups did not achieve similar results.

The findings in the area of achievement are equally revealing. On 19 out of the 21 subtests of the four achievement tests given the E_4 experimental group performed significantly better than their controls. The E_4 and E_5 children are able to demonstrate their increased level of cognitive functioning on measures that indicate educational success and are predictors of future educational competencies in our society. When comparing the experimental groups (E_4 vs E_5) at the end of kindergarten and pre and post first grade on the achievement measures, the experimental group who participated in the Learning to Learn Program for three years beginning at age four were statistically superior to the E_5 group who participated in the program for two years beginning at age five.

The ability of the experimental children to master the rudiments and skills of reading was demonstrated by their performance on both individual and group reading measures, and by the grades assigned to them by their teachers at the end of second grade (E_5 vs C_5). The reading grade level of the experimental children was approximately one year above the control children. The experimental children who participated in the Learning to Learn Program beginning age age four were above grade level on all of their reading measures. The E_5 children were graded nearly a letter grade higher than the control children by their teachers in second grade. When comparing the two experimental groups at the end of first grade the E_4 group's reading ability was superior to that of E_5 group. This supports the hypothesis that it is of more benefit to begin the children at age four than at age five.

Language development has been described by the research literature as an area where disadvantaged children show marked deficits. The experimental and control children exhibited large deficits in language ability at the onset of this research project. The development of competence in this area is extremely important since academic achievement in our schools is highly related to and dependent on the capabilities of children to (1) express themselves, (2) comprehend written and spoken material, (3) acquire verbal reasoning ability, and (4) develop the ability to handle verbal concepts. The evaluation of the language area reveals some consistent results and some encouraging trends.

The E_4 group after the first year of the program demonstrated a marked superiority in language age over their control group. The data are presented and reported in terms of language age in order to make meaningful comparisons between each group of children and the standardization

sample of the ITPA. It also provides important information about the language development status of each group in relation to chronological age. The pattern of language development is somewhat different from the pattern of intellectual development for the E_4 group. After the first year of the experimental program the E_4 group still displayed marked deficits in two areas of language development; verbal reasoning ability and language comprehension. By the end of the second year of the sequential learning program these language deficits have been alleviated to the extent that the children's language age is equal to or only slightly below their chronological age. After three years of the program the E_4 group's language age was greater than their chronological age on all subtests of the ITPA. Similar findings were evident in the other measures of language ability.

The E_5 group's language development patterns closely resembled their intellectual growth pattern of approximately equal language development over each year of the project. Their language ability improved markedly while the language functioning of the control group became more impaired over time. It should be pointed out however that the language age of the experimental children is still below their chronological age one year after termination of the Learning to Learn Program. When comparing the E_5 and C_5 groups on the language performance measures one year after the termination of the experimental program it is apparent that the E_5 group has benefited from their participation in the Learning to Learn Program. The E_5 group's spoken language, written stories, and listening discrimination ability is superior to their controls.

The post first grade comparisons between the E_4 and E_5 groups in the area of spoken language reveals a definite superiority for the E_4 children in terms of creativity, abstraction level, and language quality. The E_4 children also use more complex sentences. These results are further evidence that age four is superior to age five for implementing programs dealing with remediation and development of language.

The various measures of mathematics used in this study indicate that the experimental children have mastered the symbolic complexities of mathematics appropriate for their age levels. By the end of first and second grade these children have the ability not only to add and subtract but are able to make correct mathematical statements. Their performance on group and individual measures of mathematical ability is above grade level, and is approximately one grade level higher than their controls. There is no appreciable difference between the experimental groups (E_4 vs E_5) in mathematical ability at the end of first grade.

Results of the school grade data indicate that one year after the termination of the Learning to Learn Program the E_5 children have superior grades than their controls and are rated higher by their teachers in achievement related behavior. The E_4 children were dramatically superior to their controls when rated by their teachers on achievement related behavior.

Comparisons between the experimental and control groups on the Bender Gestalt (perceptual motor ability) revealed that the experimental children performed significantly better than their controls during each year of the project. The consistency of these results over time for both experimental groups is important, especially when comparing the two experimental groups since the E_4 group scores significantly better than the E_5 group. The consistently higher performance of the experimental children who started at age four in the sequential learning program has a multidimensional characteristic. The investigators do not want to belittle the statistically significant gains as well as the educationally significant gains of the E_5 group of children. However, these data also support the hypothesis that age four is amore beneficial time to begin intervention learning programs for the culturally disadvantaged children. Moreover, in light of the consistent superiority (in terms of test results) of the E_4 group we feel that it would be of great value to study the effects of beginning the program at age three to determine if even greater gains can be made at this earlier age.

The personality data and measures of attitudes show that both the experimental and control groups exhibit similar positive attitudes toward school, educational situations, and the way they deal with frustrating situations. The results of the I See Me Feel self concept scale indicate that both the experimental and control groups are at a high level of self concept. Based on the measures used the Learning to Learn Program has not significantly altered the personalities of its participants compared to those who attended traditional integrated public schools.

The results of the parental questionnaires suggest that the experimental program has helped the children develop a desire to learn. During the first and second grades they would bring educational materials home to continue and supplement what was learned in school to a much greater extent than the control children. The parents of the experimental children also had more frequent contacts with the teachers and schools in regard to their children.

Some of the most interesting results of this study were found when we divided each group into thirds based on the level of intelligence at the beginning of the program. Each group was divided into upper, middle, and lower subgroups based on Stanford Binet IQ prior to the start of the Learning to Learn Program. Major differences became evident in the intellectual growth patterns of the experimental subgroups over time. The intellectual growth patterns of control subgroups were similar, showing a relatively stable pattern or a mild decline of IQ over time. This was not the case for the experimental upper, middle, and lower subgroups. The E_4 subgroups all gained approximately 20 IQ points over the duration of the Learning to Learn Program. Regardless of the E_4 children's pre Learning to Learn Program Stanford Binet IQ they were all greatly affected by exposure to the Learning to Learn Program. This intellectual growth pattern was also present at the end of first grade for the upper and middle subgroups of the children who began at

age five. The E_5 lower subgroup, however, did not exhibit the intellectual gains over time that were present for the other experimental subgroups.

Collateral indications of differential growth patterns for the two experimental groups arise from comparisons on various other developmental measures. In the areas of achievement, language, teacher ratings, perceptual motor skills, and reading ability at the end of first grade, the E_4 group exhibited a marked superiority to the E_5 group. The mathematical training of both experimental groups appears to benefit each group equally. Thus a major difference between the two experimental groups exists after the first two years of the program. The lowest subgroup of the E_4 group greatly benefits from the experimental program and the lowest subgroup of the E_5 group does not.

One year after termination of the Learning to Learn Program (post second grade) the upper E_5 subgroup has maintained its high level of intellectual functioning (SBIQ 117). The middle subgroup has declined in IQ although they are still 16 SBIQ points higher than their controls and the lowest subgroup has remained relatively stable. The following hypothesis offers a possible explanation for the differential development between the children who begin at age four and those who begin at age five. The age of four may be a more critical period for compensating for the developmental lag which presumably has resulted from cultural deprivation. In other words, at the age of five, the children may be less able to compensate for this disadvantage. In addition, by the age of five they have had an additional year with a lack of systematic developmental stimulation.

In summary, the Learning to Learn sequential learning program has had a significant and positive impact on the cognitive and educational development of culturally disadvantaged children.

Conclusions

There is evidence from this study to support the following conclusions:

1. The culturally deprived children (E_4) who had three years of the experimental program beginning at age four made significantly greater progress developmentally than a matched control group (C_4) who attended Head Start Day Care Centers, Title I Kindergarten classes, and first grade.

2. The culturally deprived children (E_5) who had two years of the experimental program beginning at age five followed by second grade in public school classes made significantly greater progress developmentally than the matched control group (C_5) that attended a "traditionally" run kindergarten program and first and second grade in public school classes.

3. The E_4 group made comparatively greater developmental progress at the completion of kindergarten and first grade than the E_5 group.

4. The E_4 and E_5 groups exhibit different developmental growth and ability patterns.

5. The E_4 group made their largest developmental gains during the first year of the project.

6. The E_5 group made moderate developmental progress during each year of the experimental program and sustained their educational level in public school during second grade.

7. The language deficits of high risk children are quite resistent to improvement. The language deficits assessed at age five in the E_5 experimental children still exist after two years in the Learning to Learn Program although the deficits have significantly decreased. The language deficits assessed at age four in the E_4 experimental children were overcome after three years of participation in the Learning to Learn Program. The additional year beginning at age four appears to have alleviated their language disability.

8. The reading ability levels of the E_4 group are higher than those of the E_5 group.

9. Improvement in mathematical ability occurs much faster than improvement in language functioning. The E_4 and E_5 children obtain proficiency in mathematics ability irrespective of their beginning IQ.

10. The E_4 subgroup comparisons, based on different beginning intelligence levels, indicate that all subgroups benefitted intellectually from their participation in the Learning to Learn Program.

11. The E_5 subgroup comparisons indicate that only the upper and middle subgroups benefitted intellectually from their participation in the Learning to Learn Program.

12. Beginning the experimental program at age four has greater educational payoff than beginning at age five for educationally high risk children.

13. The Learning to Learn Program has developed a sequential comprehensive curriculum and methodological approach that is successful in educating high risk poverty children during nursery school, kindergarten, and first grade.

Conclusions relating to the Objectives and Hypotheses of the Evaluation Program

The first hypothesis of this study was the E_4 group would be developmentally superior to the E_5 group at the end of each year of Learning to Learn Program (through first grade). This hypothesis was confirmed. The E_4 group performed significantly better developmentally and statistically* than the E_5 group on the following measures:

1 = Post kindergarten
2 = Post first grade

I. Intelligence
*A) Stanford Binet IQ - 1

II. Achievement
*A) School Readiness Screening Test - 1
*B) Metropolitan Readiness Test - Subtests - 1
*1) Matching
*2) Copying
*3) Total Score of the MRT

*C) Stanford Achievement Test I - Subtests - 2
*1) Word Reading
*2) Paragraph Meaning
*3) Vocabulary
*4) Word Study Skills

III. Language
A) Illinois Test of Psycholinguistic Abilities Subtest
*1) Visual Decoding
*B) Verbal Stories
*1) Creativity - 2
*2) Abstraction - 2
*3) Language Quality - 2
*4) Number of Sentences - 2

IV. School Data
*A) Teacher Ratings
*1) Goal Directedness - 2

V. Perceptual Motor
*A) Bender Gestalt - 1

The second hypothesis was that the E_4 group would be developmentally superior to the control group (C_4) at the end of each year of the Learning to Learn Program, (post-nursery, post-kindergarten, and post first grade). This hypothesis was confirmed since the E_4 group was developmentally and statistically* superior to the C_4 group on the following measures at the end of each year of the program.

1 = After the first year of the Learning to Learn Program (post nursery)
2 = After two years of the Learning to Learn Program (post kindergarten)
3 = After three years of the Learning to Learn Program (post first grade)

*Statistically significant at the .05 level or beyond

I. Intelligence
- *A) Stanford Binet IQ - 1, 2, 3
- *B) WISC VIQ - 3

II. Achievement
- *A) School Readiness Screening Test - 2
- *B) Metropolitan Readiness Test (all subtests) - 2
- *C) Primary Mental Abilities I - Subtests - 3
  - *1) Verbal Meaning
  - *2) Number Facility
  - *3) Spatial Relations
  - *4) Summation of raw scores of all subtests
- *D) Stanford Achievement Test I - 3
  - *1) all subtests

III. Reading
- *A) Reading Subtests of the SAT I - 3
  - *1) all subtests
- *B) Reading Subtests of the PMA I - 3
- *C) Spache Diagnostic Reading Tests Subtests - 3
  - *1) all subtests

IV. Language
- *A) Illinois Test of Psycholinguistic Abilities Subtests
  - *1) Visual Decoding - 1
  - *2) Visual Motor Association - 1, 2, 3
  - *3) Vocal Encoding - 1, 3
  - *4) Auditory Vocal Association - 1, 2, 3
- *B) Verbal Stories
  - *1) Creativity - 3
  - *2) Abstraction - 3
  - *3) Language Quality - 3
  - *4) Number of Sentences - 3
  - *5) Length of Remark - 2, 3
- *C) Picture Story Language Test (written stories) - 3
  - *1) all subtests

V. Mathematics
- *A) Mathematics Measure of the SAT - 3
- *B) Mathematics Measure of the PMA - 3
- *C) Arithmetic Subtest of the WISC - 3
- *D) Mathematics Performance Measures I - 3

VI. School Data
- A) Teacher Ratings
  - *1) Effort - 2, 3
  - *2) Persistence - 3
  - *3) Goal Directedness - 2, 3
  - *4) Independence - 3
  - *5) Total Raw Score of all subtests - 2, 3

VII. Perceptual Motor
- *A) Bender Gestalt - 1, 2, 3

*Statistically significant at the .05 level or beyond

The third hypothesis was that group E_5 would be developmentally superior to their control group (C_5) at the end of kindergarten, first grade, and one year after termination of the Learning to Learn Program, (post-second grade). This hypothesis was confirmed since the E_5 group was developmentally and statistically* superior to the C_5 group on the following measures at the end of each year of the program.

1 = After the first year of the Learning to Learn Program (post-kindergarten)
2 = After the second year of the Learning to Learn Program (post-first grade)
3 = One year after termination of the Learning to Learn Program (post-second grade)

I. Intelligence
- *A) Stanford Binet IQ - 1, 2, 3
- *B) WISC VIQ - 3
- *C) Primary Mental Abilities II Deviation IQ - 3

II. Achievement
- *A) School Readiness Screening Test - 1
- *B) Metropolitan Readiness Test - 1
  - *1) all subtests
- *C) Primary Mental Abilities I - 2
  - *1) all subtests
- *D) Primary Mental Abilities II - Subtests - 3
  - *1) Verbal Meaning
  - *2) Perceptual Speed
  - *3) Number Facility
- *E) Stanford Achievement Test I - Subtests - 2
  - *1) Word Reading
  - *2) Paragraph Meaning
  - *3) Spelling
  - *4) Arithmetic
- *F) Stanford Achievement Test II - Subtests - 3
  - *1) Word Meaning
  - *2) Paragraph Meaning
  - *3) Science & Social Studies
  - *4) Spelling
  - *5) Arithmetic Computation
  - *6) Arithmetic Concepts

III. Reading
- *A) Reading Subtests of the SAT
  - *1) Word Reading - 2, 3
  - *2) Paragraph Meaning - 2, 3
- *B) Reading Subtest of the PMA - 2, 3
- *C) Spache Diagnostic Reading Test Subtests - 3
  - *1) Word Recognition Level
  - *2) Instructional Reading Level
- *D) School Reading Grades - 3

*Statistically significant at the .05 level or beyond

IV. Language
- *A) Illinois Test of Psycholinguistic Abilities - Subtests
  - *1) Visual Motor Association - 1, 3
  - *2) Vocal Encoding - 2
  - *3) Auditory Vocal Association - 1, 2, 3
- *B) Verbal Stories
  - *1) Creativity - 3
  - *2) Abstraction - 3
  - *3) Language Quality - 3
  - *4) Length of Remark - 3
- *C) Picture Story Language Test (written stories) - 3
  - *1) all subtests

V. Mathematics
- *A) Mathematics Subtests of the SAT - 2, 3
- *B) Mathematics Subtests of the PMA - 2, 3
- *C) Arithmetic Subtests of the WISC - 3
- *D) School Grade in Mathematics - 3
- *E) Mathematics Performance Measure I - 2
  - *1) all subtests

VI. School Data
- A) Teacher Ratings
  - *1) Fear of Failure - 3
- B) School Grades - 3
  - *1) all academic subtests

VII. Perceptual Motor
- A) Bender Gestalt - 1, 2, 3

Implications

The results of this study indicate that there is educational and developmental "payoff" in conducting comprehensive early childhood enrichment programs for educationally high-risk children.

This extensive longitudinal evaluation was performed in order to obtain qualitative, quantitative, and descriptive data that represent a comprehensive, valid, and reliable evaluation of the developmental changes, educational performance, and academic adequacy of children participating in the Learning to Learn Program and in "traditional" educational programs.

The developmental patterns of the subgroups provide a basis for generalizations relevant to be impact and effects of beginning programs at different ages. There are also some suggestive data about the amount of enrichment necessary for children of different ability levels. The design of the research program has yielded data which is helpful in discovering the kinds and amounts of intervention that are most helpful to different children. It has given us some direction in learning how to help more children and how to help children more.

The children completing the Learning to Learn Program have maintained their educational gains across a number of developmental measures. The evidence indicates that an effective early childhood program can provide enough cognitive, social, and motivational support to enable educationally high-risk children to achieve academically in public school systems for at least one year following the intervention and hopefully much longer.

On the basis of these positive results and in light of the controversial evidence about the long term effects of intervention programs, it is important that follow-up evaluations be performed through the elementary school years on the high-risk children who participated in this study.

Summary

This study was designed to investigate the effects of two or three years of a sequential educational intervention program on culturally deprived children.

Two groups of four-year-olds and two groups of five-year-olds were matched on several developmental variables, with one group at each age level entering the experimental Learning to Learn Program. The other groups served as controls and the four-year-olds entered day care centers while the five-year-olds attended "traditionally" run kindergartens. During the second year the experimental groups attended kindergarten and first grade at the Learning to Learn School while the control groups attended Title I kindergarten and "traditional" first grade classes in public schools. During the third year of the project the experimental group who started at age four attended first grade in the Learning to Learn School and the experimental group who started at age five attended second grade in public school. The control groups attended first and second grade classes in public school.

Comparison on a number of developmental measures were made between the experimental and control groups after the first, second, and third years of the program.

The results indicate that E_4 Learning to Learn children who began the program at age four made much larger developmental gains than their matched control group. The E_5 Learning to Learn children who began the program at age five also advanced more rapidly than their matched control group. The developmental gains of the E_4 group who were in the experimental program one additional year were superior to the gains of the E_5 group.

This project strongly supports the contention that early intervention programs with culturally deprived children can rectify their educational deficits.

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Appendix

Individual Raw Data Collected for E_4 Group During 3 Years in Experimental Learning to Learn Program starting at Age 4 (Nursery School Level) Fall 1968 to Age 7 (Post First Grade) Spring 1971

Subject No.	Birthdate	BINET				ITPA					
		Pre N	Post N	Post K	Post 1st	VE Post N	VE Post K	VE Post 1st	VD Post N	VD Post K	VD Post 1st
1.	4/17/64	101	96	112	118	16	23	23	7	14	17
2.	8/11/64	95	127	120	-	12	14	-	2	12	-
3.	8/20/64	86	114	122	101	16	9	20	10	11	16
4.	2/6/64	73	93	93	97	8	19	-	1	10	13
5.	5/21/64	73	94	91	97	11	14	22	8	13	12
6.	6/22/64	87	107	107	106	14	19	19	12	13	16
7.	8/23/64	86	105	-	-	12	-	-	9	-	-
8.	9/19/64	80	124	118	102	9	12	15	9	14	16
9.	3/17/64	105	128	110	113	13	15	19	14	14	16
10.	12/19/64	111	118	107	116	11	10	15	8	14	10
11.	6/5/64	97	105	100	-	14	7	-	11	13	-
12.	1/19/64	86	107	122	107	9	11	21	12	13	19
13.	1/5/64	97	105	126	119	8	21	31	9	11	20
14.	4/1/64	109	117	135	128	12	14	17	7	13	20
15.	2/18/64	80	95	88	85	14	11	21	7	6	14
16.	10/1/64	90	107	113	107	10	8	18	10	12	16
17.	5/26/64	73	100	97	93	10	12	9	9	12	11
18.	1/27/64	99	98	104	117	7	18	16	7	12	15
19.	8/19/64	82	111	110	117	11	11	20	8	11	9
20.	7/11/64	84	101	94	100	10	20	14	8	14	19
21.	12/13/64	77	105	127	125	17	11	16	12	9	16
22.	4/17/64	74	109	93	95	16	14	20	2	10	11
23.	7/12/64	71	101	99	96	15	10	-	1	8	13

Appendix

Individual Raw Data Collected for E_4 Group During 3 Years in Experimental Learning to Learn Program starting at Age 4 (Nursery School Level) Fall 1968 to Age 7 (Post First Grade) Spring 1971

Subject No.	ITPA						BENDER			SRST
	AVA Post N	AVA Post K	AVA Post 1st	VMA Post N	VMA Post K	VMA Post 1st	Post N	Post K	Post 1st	Post K
1.	16	18	22	17	18	18	15	12	11	18
2.	13	20	-	11	15	-	21	13	-	24
3.	11	14	21	18	19	14	18	8	6	27
4.	5	13	17	12	14	19	15	7	6	16
5.	9	15	18	10	17	21	15	6	5	24
6.	11	17	21	15	15	19	17	11	5	25
7.	10	-	-	12	-	-	11	-	-	-
8.	9	15	19	6	18	18	16	12	5	21
9.	17	20	25	18	18	16	16	10	3	25
10.	7	14	21	19	17	20	16	12	8	19
11.	12	17	-	10	14	-	18	6	-	21
12.	17	21	22	11	16	19	17	11	6	25
13.	11	20	23	11	18	19	13	8	1	23
14.	17	21	21	17	18	23	21	9	10	29
15.	4	8	16	9	12	15	12	8	5	14
16.	13	13	22	14	21	21	14	9	4	22
17.	5	15	20	13	10	9	18	9	3	24
18.	14	20	23	12	18	19	13	7	4	26
19.	12	18	21	15	19	24	19	12	6	20
20.	7	11	12	15	16	13	25	14	9	14
21.	12	16	22	14	20	24	23	14	6	18
22.	4	16	20	13	20	15	9	14	8	18
23.	6	13	20	7	14	18	17	8	6	19

Individual Raw Data Collected for E_4 Group During 3 Years in Experimental Learning to Learn Program starting at Age 4 (Nursery School Level) Fall 1968 to Age 7 (Post First Grade) Spring 1971

Subject No.	PRIMARY MENTAL ABILITIES TEST				
	Verbal Meaning Post 1st	Percept. Speed Post 1st	Number Facility Post 1st	Spatial Relations Post 1st	Total Post 1st
1.	44	25	22	18	109
2.	-	-	-	-	-
3.	34	22	22	13	91
4.	37	17	15	19	88
5.	32	12	17	20	81
6.	38	15	18	16	87
7.	-	-	-	-	-
8.	39	19	19	19	96
9.	42	27	20	19	108
10.	36	20	20	20	96
11.	-	-	-	-	-
12.	40	23	23	15	101
13.	39	28	18	20	105
14.	44	23	25	16	108
15.	36	26	19	19	100
16.	33	18	18	22	91
17.	38	18	24	20	100
18.	33	20	23	16	92
19.	37	20	20	19	96
20.	27	19	12	14	72
21.	39	11	18	18	86
22.	27	14	20	12	73
23.	35	10	20	20	85

Appendix

Individual Raw Data Collected for E_4 Group During 3 Years in Experimental Learning to Learn Program starting at Age 4 (Nursery School Level) Fall 1968 to Age 7 (Post First Grade) Spring, 1971

Subject No.	SPACHE DIAGNOSTIC READING SCALES Word Recognition Post-1st	Instructional Post-1st	Potential Post-1st
1.	2.9	2.8	4.5
2.	-	-	-
3.	2.3	2.8	4.5
4.	2.3	2.3	4.5
5.	2.1	1.8	2.8
6.	2.0	1.8	2.8
7.	-	-	-
8.	2.5	2.3	3.3
9.	2.5	2.3	4.5
10.	4.1	3.8	4.5
11.	-	-	-
12.	3.4	3.3	4.5
13.	2.5	2.8	2.8
14.	3.9	3.8	4.5
15.	2.4	2.3	1.8
16.	2.8	2.8	2.8
17.	2.8	2.8	2.8
18.	2.3	2.3	3.3
19.	2.2	1.8	2.8
20.	2.0	1.8	2.3
21.	1.9	1.6	3.8
22.	2.5	2.3	2.3
23.	3.3	2.8	3.8

Appendix

Individual Raw Data Collected for E_4 Group During 3 Years in Experimental Learning to Learn Program starting at Age 4 (Nursery School Level) Fall 1968 to Age 7 (Post First Grade) Spring 1971

Subject No.	WISC VERBAL TESTS										
	Inf.		Comp.		Arith.		Sim.		Vocab.		VIQ
	Post RS	1st SS	Post RS	1st SS	Post RS	1st SS	Post RS	1st SS	Post RS	1st SS	Post 1st
1.	9	12	7	10	7	14	8	14	22	11	114
2.	-	-	-	-	-	-	-	-	-	-	-
3.	7	9	8	11	4	8	6	11	12	6	94
4.	8	10	7	10	5	10	4	9	14	6	94
5.	8	11	6	9	5	10	5	10	14	7	96
6.	7	9	7	10	5	10	7	13	15	8	-
7.	-	-	-	-	-	-	-	-	-	-	-
8.	7	9	6	9	5	10	9	15	15	8	101
9.	9	12	7	10	5	10	8	14	12	5	101
10.	6	8	3	6	5	11	4	9	16	9	91
11.	-	-	-	-	-	-	-	-	-	-	-
12.	10	12	7	9	7	13	9	14	24	11	111
13.	9	12	9	12	5	10	8	14	18	9	109
14.	9	12	9	12	7	14	8	14	17	8	113
15.	7	9	7	10	5	10	5	10	19	10	99
16.	7	10	6	10	6	14	6	12	14	7	104
17.	7	9	8	11	6	13	4	9	13	7	99
18.	10	12	7	9	6	11	7	12	18	8	103
19.	8	11	11	15	6	13	6	11	14	7	109
20.	6	7	5	8	5	10	5	10	16	8	91
21.	9	13	9	13	5	11	9	16	13	7	113
22.	7	9	4	6	5	10	8	14	13	6	94
23.	8	11	9	12	7	16	5	10	16	8	109

Appendix

Individual Raw Data Collected for E_4 Group During 3 Years in Experimental Learning to Learn Program starting at Age 4 (Nursery School Level) Fall 1968 to Age 7 (Post First Grade) Spring 1971

Subject No.	TEACHER'S RATINGS											
	Effort		Persistence		Goal		Independence		Failure		Total	
	Post K	Post 1st	Post K	Post 1st	Post K	Post 1st	Post K	Post 1st	Post K	Post 1st	Post K	Post 1st
1.	3	4	4	4	4	4	4	3	4	2	19	17
2.	3	-	3	-	4	-	3	-	3	-	16	-
3.	4	3	2	3	3	3	2	3	2	3	13	15
4.	3	2	2	2	2	2	2	2	2	2	11	10
5.	4	4	2	4	3	3	2	3	2	3	13	17
6.	3	3	2	3	3	3	2	3	2	3	12	15
7.	-	-	-	-	-	-	-	-	-	-	-	-
8.	4	3	4	3	3	3	3	3	3	2	17	14
9.	2	4	2	4	4	4	3	3	3	3	14	18
10.	3	2	4	4	4	3	3	3	2	1	16	13
11.	4	-	2	-	3	-	3	-	2	-	14	-
12.	2	3	3	4	4	4	3	4	3	4	15	19
13.	4	4	3	4	4	4	4	4	3	4	18	20
14.	3	3	3	4	3	4	3	4	3	4	15	19
15.	3	3	2	3	3	3	2	2	2	2	12	13
16.	4	3	2	2	3	3	2	2	2	2	13	12
17.	4	4	3	3	3	3	2	3	2	3	14	16
18.	4	4	3	4	3	4	3	4	3	3	16	19
19.	3	3	2	2	3	3	2	2	2	1	12	11
20.	2	2	1	2	1	2	1	2	1	1	6	9
21.	3	3	1	3	2	3	1	3	2	3	9	15
22.	4	3	3	3	3	3	3	2	3	2	16	13
23.	4	4	3	4	3	4	3	3	3	2	16	17

Appendix

Individual Raw Data Collected for E_4 Group During 3 Years in Experimental Learning to Learn Program starting at Age 4 (Nursery School Level) Fall 1968 to Age 7 (Post First Grade) Spring 1971

Subject No.	METROPOLITAN READINESS TEST						
	Word Meaning # Right Pre-1st	Listening # Right Pre-1st	Matching # Right Pre-1st	Alphabet # Right Pre-1st	Numbers # Right Pre-1st	Copying # Right Pre-1st	Total # Right Pre-1st
1.	10	13	11	16	19	11	80
2.	6	13	11	16	15	7	68
3.	8	13	13	15	14	8	71
4.	6	7	9	16	12	12	62
5.	7	12	7	16	12	11	65
6.	9	12	7	16	13	9	66
7.	-	-	-	-	-	-	-
8.	6	13	8	16	14	9	66
9.	10	15	13	16	16	12	82
10.	7	9	10	16	15	8	65
11.	6	11	13	15	17	13	75
12.	11	9	5	16	20	7	68
13.	9	12	14	16	18	13	82
14.	12	13	11	16	18	10	80
15.	7	11	12	15	18	12	75
16.	8	11	11	16	18	11	75
17.	8	10	13	16	15	12	74
18.	7	8	11	16	19	10	71
19.	6	12	12	16	17	11	74
20.	6	10	7	16	14	7	60
21.	8	10	8	15	17	7	65
22.	7	6	7	16	17	6	59
23.	6	11	12	15	14	12	70

Appendix

Individual Raw Data Collected for E_4 Group During 3 Years in Experimental Learning to Learn Program starting at Age 4 (Nursery School Level) Fall 1968 to Age 7 (Post First Grade) Spring, 1971

Subject No.	STANFORD ACHIEVEMENT TEST											
	Word Reading		Paragraph		Vocabulary		Spelling		Word Study		Arithmetic	
	# Right Post-1st	Grade Score Post-1st	# Right Post-1st	Grade Score Post-1st	# Right Post-1st	Grade Score Post-1st	# Right Post-1st	Grade Score Post-1st	# Right Post-1st	Grade Score Post-1st	# Right Post-1st	Grade Score Post-1st
1.	24	19	26	20	24	22	18	28	44	25	51	25
2.	-	-	-	-	-	-	-	-	-	-	-	-
3.	20	17	12	16	24	22	16	24	31	16	50	24
4.	22	18	21	18	15	14	14	22	34	18	35	18
5.	14	15	21	18	19	16	15	23	33	17	41	20
6.	16	16	15	16	21	18	15	23	35	18	46	22
7.	-	-	-	-	-	-	-	-	-	-	-	-
8.	21	18	17	17	24	22	17	26	41	22	39	19
9.	24	19	28	21	29	20	17	16	48	30	50	24
10.	29	24	35	29	21	18	20	34	38	20	45	22
11.	-	-	-	-	-	-	-	-	-	-	-	-
12.	27	22	29	22	31	33	19	30	42	23	51	25
13.	25	20	30	23	28	27	18	28	44	25	54	26
14.	31	26	36	31	28	27	20	34	48	30	57	29
15.	23	19	24	19	19	16	16	24	41	22	42	20
16.	25	20	26	20	20	17	18	28	40	21	50	24
17.	23	19	28	21	21	18	14	22	37	19	46	22
18.	21	18	17	17	20	17	15	23	34	18	48	23
19.	18	17	22	18	21	18	14	22	28	15	50	24
20.	15	15	19	17	18	15	10	18	31	16	41	20
21.	16	16	19	17	28	27	11	19	43	24	51	25
22.	17	16	17	17	21	18	17	26	36	19	42	20
23.	24	19	23	18	20	17	18	28	41	22	48	23

Appendix

Individual Raw Data Collected for E_4 Group During 3 Years in Experimental Learning to Learn Program starting at Age 4 (Nursery School Level) Fall 1968 to Age 7 (Post First Grade) Spring 1971

Subject No.	STORIES Creativity Post K	Creativity Post 1st	Abstraction Post K	Abstraction Post 1st	Lang. Quality Post K	Lang. Quality Post 1st	No. Words Post K	No. Words Post 1st	No. Sentences Post K	No. Sentences Post 1st	Mean Length Post K	Mean Length Post 1st
1.	4.0	6.0	3,5	6.0	3.5	6.0	149	255	9	17	6.95	15.00
2.	4.0	-	4.0	-	4.0	-	50	-	4	-	7.14	-
3.	4.5	5.0	4.5	5.0	3.5	4.0	65	163	6	13	9.29	12.54
4.	2.5	4.5	2.5	4.0	2.5	3.5	112	329	11	24	7.0	13.16
5.	3.5	5.0	3.5	5.0	3.5	4.0	101	82	8	11	7.77	7.45
6.	4.5	6.0	4.5	6.0	3.5	5.0	129	200	8	20	9.11	9.52
7.	-	-	-	-	-	-	-	-	-	-	-	-
8.	3.5	4.5	4.0	4.0	3.5	4.0	50	126	3	13	8.67	9.69
9.	3.0	5.5	4.0	5.5	3.0	5.5	47	209	6	24	6.25	10.73
10.	2.5	5.5	3.5	6.0	2.5	5.0	80	344	6	29	8.89	11.47
11.	4.5	-	4.0	-	4.0	-	177	-	10	-	9.72	-
12.	5.5	5.0	5.0	5.0	4.5	4.0	96	391	9	28	8.20	13.03
13.	4.0	5.0	5.5	6.0	4.5	5.5	459	226	20	13	10.62	15.06
14.	2.0	6.0	3.5	6.0	3.0	5.5	32	873	6	56	5.33	15.59
15.	5.5	4.0	5.0	5.0	5.0	4.0	129	562	13	44	8.73	12.77
16.	2.0	5.0	3.5	5.0	2.0	3.0	30	67	2	8	6.20	7.44
17.	1.0	5.0	1.0	5.0	1.0	3.0	17	69	0	10	2.13	6.90
18.	5.5	5.5	5.5	5.0	5.5	5.0	155	145	10	17	10.27	7.63
19.	2.0	6.0	3.0	5.0	3.0	4.0	74	76	8	8	7.50	9.50
20.	3.5	4.5	4.0	5.0	3.0	5.0	80	104	4	9	8.29	9.45
21.	4.0	5.5	5.5	6.0	4.5	5.0	120	196	8	19	9.38	10.31
22.	2.5	3.0	2.5	4.0	2.0	4.0	21	150	4	10	4.20	15.00
23.	4.0	5.0	4.5	5.0	4.5	4.0	358	189	27	20	7.37	9.45

Appendix

Individual Raw Data Collected for E_4 Group During 3 Years in Experimental Learning to Learn Program starting at Age 4 (Nursery School Level) Fall 1968 to Age 7 (Post First Grade) Spring 1971

Subject No.	PICTURE STORY LANGUAGE TEST					
	Productivity			Abstract-Concrete		Syntax
	Total Words	Total Sentences	Words Per Sentence	Level Attained	Raw Score	Syntax Quotients
1.	22	2	11.00	3	7	97.04
2.	-	-	-	-	-	-
3.	52	5	10.40	4	20	80.00
4.	18	3	6.00	3	7	82.47
5.	9	2	4.50	3	7	90.00
6.	34	4	8.50	3	7	73.80
7.	-	-	-	-	-	-
8.	58	7	8.29	4	13	78.46
9.	23	4	5.75	4	17	81.18
10.	74	9	8.22	4	14	77.78
11.	-	-	-	-	-	-
12.	27	4	6.75	3	8	82.98
13.	93	9	10.33	4	20	79.59
14.	23	3	7.67	4	17	90.80
15.	53	8	6.60	4	17	72.63
16.	32	5	6.40	4	13	82.85
17.	18	2	9.00	3	8	86.42
18.	19	3	6.33	3	8	81.81
19.	26	4	6.25	3	8	81.18
20.	25	4	6.25	3	8	70.37
21.	11	2	5.50	2	4	81.10
22.	67	8	8.38	3	8	75.35
23.	34	5	6.80	4	20	77.50

Appendix

Individual Raw Data Collected for C_4 Group During 3 Years as Controls in Day Care Centers and Public Schools starting at Age 4 (Nursery School Level) Fall 1968 to Age 7 (Post First Grade) Spring 1971

Subject No.	Birthdate	BINET				ITPA					
		Pre N	Post N	Post K	Post 1st	VE Post N	VE Post K	VE Post 1st	VD Post N	VD Post K	VD Post 1st
1.	9/15/64	80	77	-	-	7	-	-	0	-	-
2.	5/25/64	89	90	99	93	12	17	11	6	8	11
3.	11/21/64	90	103	96	101	14	10	20	6	15	15
4.	4/7/64	95	82	96	-	4	19	-	9	13	9
5.	2/12/64	101	88	94	89	6	15	10	6	13	-
6.	3/8/64	105	91	99	100	13	18	21	10	16	18
7.	9/1/64	95	93	83	78	8	6	11	3	10	15
8.	4/15/64	79	81	82	80	2	11	14	2	10	10
9.	12/1/64	92	93	90	82	10	7	8	3	3	-
10.	4/11/64	82	71	79	80	6	11	7	1	8	13
11.	7/20/64	93	92	87	78	7	12	7	2	10	-
12.	9/26/64	82	77	88	86	5	10	19	2	6	12
13.	7/22/64	84	75	89	82	4	9	8	2	6	-
14.	12/3/64	85	78	91	83	4	9	15	1	11	16
15.	10/4/64	84	93	110	94	9	11	7	1	15	16
16.	4/30/64	79	72	91	105	8	16	12	6	11	18
17.	5/15/64	89	94	102	108	13	9	16	12	13	14
18.	10/4/64	82	78	97	-	3	8	-	1	15	-
19.	11/11/64	90	105	117	114	12	21	[illegible]	12	12	14
20.	4/28/64	83	91	90	80	10	11	12	4	14	16
21.	9/10/64	92	84	98	106	7	14	8	6	12	-

Appendix

Individual Raw Data Collected for C_4 Group During 3 Years as Controls in Day Care Centers and Public Schools starting at Age 4 (Nursery School Level Fall 1968 to Age 7 (Post First Grade) Spring 1971

	ITPA						BENDER			SRST
Subject No.	AVA Post N	AVA Post K	AVA Post 1st	VMA Post N	VMA Post K	VMA Post 1st	Post N	Post K	Post 1st	Post K
1.	1	-	-	9	-	-	22	-	-	-
2.	8	8	13	12	19	13	14	15	12	21
3.	5	12	16	9	11	21	20	15	10	13
4.	9	16	-	14	17	-	18	13	-	19
5.	11	16	16	14	18	-	21	16	8	20
6.	9	19	19	12	19	21	18	12	10	21
7.	4	6	11	8	16	19	21	16	16	17
8.	1	9	10	1	10	12	28	14	10	6
9.	8	12	18	1	9	-	30	16	14	10
10.	1	6	14	0	17	19	30	20	18	13
11.	9	10	15	1	14	-	17	15	12	15
12.	6	11	14	5	12	14	30	18	11	15
13.	4	10	12	1	1	-	17	17	13	12
14.	0	8	15	4	13	12	30	21	9	12
15.	4	16	20	9	15	18	20	11	9	19
16.	6	19	20	11	20	18	19	18	12	17
17.	8	17	18	10	11	15	15	10	4	23
18.	2	15	-	12	17	-	21	15	-	18
19.	13	17	17	15	15	16	14	13	7	18
20.	13	15	14	12	19	16	17	15	15	20
21.	8	15	16	11	14	-	20	15	8	13

Appendix

Individual Raw Data Collected for C_4 Group During 3 Years as Controls in Day Care Centers and Public Schools starting at Age 4 (Nursery School Level) Fall, 1968 to Age 7 (Post First Grade) Spring 1971

Subject No.	PRIMARY MENTAL ABILITIES TEST				
	Verbal Meaning Post 1st	Percept. Speed Post 1st	Number Facility Post 1st	Spatial Relations Post 1st	Total Post 1st
1.	-	-	-	-	-
2.	31	26	14	17	88
3.	33	21	10	18	82
4.	-	-	-	-	-
5.	32	19	17	20	88
6.	36	16	22	19	93
7.	29	18	14	12	73
8.	15	15	9	6	45
9.	27	19	10	17	73
10.	23	17	10	8	58
11.	31	26	23	8	88
12.	32	13	12	5	62
13.	17	19	14	19	69
14.	19	1	10	13	43
15.	35	25	17	16	93
16.	38	25	15	10	88
17.	31	26	23	13	93
18.	-	-	-	-	-
19.	29	21	22	15	87
20.	35	11	17	17	80
21.	31	20	14	19	84

Appendix

Individual Raw Data Collected for C_4 Group During 3 Years as Controls in Day Care Centers and Public Schools starting at Age 4 (Nursery School Level) Fall 1968 to Age 7 (Post First Grade) Spring, 1971

Subject No.	SPACHE DIAGNOSTIC READING SCALES Word Recognition Post-1st	Instructional Post-1st	Potential Post-1st
1.	-	-	-
2.	1.8	1.0	1.0
3.	1.0	1.0	2.8
4.	-	-	-
5.	1.3	1.0	3.3
6.	1.3	1.0	2.3
7.	1.8	1.0	1.8
8.	1.0	1.0	1.0
9.	1.0	1.0	1.6
10.	1.0	1.0	1.6
11.	2.5	1.8	2.8
12.	1.0	1.0	1.6
13.	1.0	1.0	1.0
14.	1.0	1.0	1.0
15.	2.2	1.6	2.3
16.	2.3	2.3	4.5
17.	3.1	2.8	2.8
18.	-	-	-
19.	2.2	1.6	1.6
20.	1.0	1.0	1.0
21.	1.7	1.0	1.8

Appendix

Individual Raw Data Collected for C_4 Group During 3 Years as Controls in Day Care Centers and Public Schools starting at Age 4 (Nursery School Level) Fall 1968 to Age 7 (Post First Grade) Spring 1971

Subject No.	WISC VERBAL TESTS										
	Inf.		Comp.		Arith.		Sim.		Vocab.		VIQ
	Post RS	1st SS	Post RS	1st SS	Post RS	1st SS	Post RS	1st SS	Post RS	1st SS	Post 1st
1.	-	-	-	-	-	-	-	-	-	-	-
2.	6	7	5	8	5	10	4	9	8	4	85
3.	4	5	6	10	5	11	3	8	16	9	91
4.	-	-	-	-	-	-	-	-	-	-	-
5.	6	7	6	9	4	8	3	7	17	8	86
6.	7	9	8	11	5	10	8	14	14	6	100
7.	5	6	4	7	4	8	7	13	12	6	87
8.	5	6	0	2	5	10	2	5	13	6	74
9.	0	12	6	10	5	11	4	9	14	7	99
10.	5	6	5	7	4	8	2	5	12	5	76
11.	7	9	4	7	6	13	3	7	14	7	91
12.	8	12	1	4	2	6	4	9	14	7	85
13.	6	7	3	6	4	8	3	6	13	7	80
14.	5	7	1	4	4	9	6	12	11	6	88
15.	6	8	2	5	6	14	5	11	11	6	92
16.	7	9	7	10	5	10	8	14	11	5	97
17.	-	-	-	-	-	-	-	-	-	-	-
18.	-	-	-	-	-	-	-	-	-	-	-
19.	7	10	6	10	5	11	7	14	16	9	105
20.	7	9	8	11	5	10	10	16	15	7	104
21.	7	9	7	10	5	10	4	9	15	8	95

Appendix

Individual Raw Data Collected for C_4 Group During 3 Years as Controls in Day Care Centers and Public Schools starting at Age 4 (Nursery School Level Fall 1968 to Age 7 (Post First Grade) Spring 1971

Subject No.	TEACHER'S RATINGS											
	Effort		Persistence		Goal		Independence		Failure		Total	
	Post K	Post 1st	Post K	Post 1st	Post K	Post 1st	Post K	Post 1st	Post K	Post 1st	Post K	Post 1st
1.	-	-	-	-	-	-	-	-	-	-	-	-
2.	3	2	2	3	4	2	3	2	2	2	14	11
3.	2	2	2	2	2	2	2	2	2	2	10	10
4.	4	-	4	-	4	-	4	-	4	-	20	-
5.	3	2	3	2	3	2	3	2	3	3	15	11
6.	3	2	3	2	3	1	3	2	3	1	15	8
7.	3	2	3	2	3	1	3	1	3	2	15	8
8.	2	2	2	2	2	2	2	3	2	4	10	13
9.	0	1	0	1	0	1	0	1	0	4	0	8
10.	2	1	1	3	2	2	1	1	2	2	8	9
11.	3	4	3	4	3	3	3	3	3	3	15	17
12.	2	1	2	1	2	1	2	1	2	1	10	5
13.	2	2	2	1	2	2	2	1	2	1	10	7
14.	2	1	2	1	1	1	1	1	2	4	8	8
15.	2	3	2	3	2	2	2	3	2	2	10	13
16.	3	4	3	4	4	3	3	3	3	3	16	17
17.	3	4	3	3	3	3	3	4	3	3	15	17
18.	2	-	2	-	2	-	2	-	2	-	10	-
19.	3	2	3	2	3	2	3	3	3	2	15	11
20.	2	2	2	2	2		2	2	2	2	10	10
21.	2	3	1	1	1	2	2	2	2	1	8	8

Appendix

Individual Raw Data Collected for C_4 Group During 3 Years as Controls in Day Care Centers and Public Schools starting at Age 4 (Nursery School Level) Fall 1968 to Age 7 (Post First Grade) Spring 1971

Subject No.	METROPOLITAN READINESS TEST						
	Word Meaning # Right Pre-1st	Listening # Right Pre-1st	Matching # Right Pre-1st	Alphabet # Right Pre-1st	Numbers # Right Pre-1st	Copying # Right Pre-1st	Total # Right Pre-1st
1.	-	-	-	-	-	-	-
2.	6	5	7	4	8	5	35
3.	1	8	7	6	4	5	32
4.	-	-	-	-	-	-	-
5.	-	-	-	-	-	-	-
6.	-	-	-	-	-	-	-
7.	5	6	3	3	5	0	22
8.	5	7	1	6	6	5	30
9.	4	6	0	0	2	0	12
10.	-	-	-	-	-	-	-
11.	5	5	12	7	9	5	43
12.	2	8	1	10	8	7	36
13.	8	5	3	12	7	1	36
14.	1	5	1	2	8	0	17
15.	5	10	7	14	11	6	54
16.	-	-	-	-	-	-	-
17.	7	9	14	15	15	12	72
18.	-	-	-	-	-	-	-
19.	5	9	9	13	11	6	53
20.	5	10	5	12	9	2	43
21.	3	4	3	3	8	0	21

Appendix

Individual Raw Data Collected for C_4 Group During 3 Years as Controls in Day Care Centers and Public Schools starting at Age 4 (Nursery School Level) Fall 1968 to Age 7 (Post First Grade) Spring, 1971

Subject No.	STANFORD ACHIEVEMENT TEST											
	Word Reading		Paragraph		Vocabulary		Spelling		Word Study		Arithmetic	
	# Right Post-1st	Grade Score Post-1st	# Right Post-1st	Grade Score Post-1st	# Right Post-1st	Grade Score Post-1st	# Right Post-1st	Grade Score Post-1st	# Right Post-1st	Grade Score Post-1st	# Right Post-1st	Grade Score Post-1st
1.	-	-	-	-	-	-	-	-	-	-	-	-
2.	11	13	14	16	12	12	6	16	29	15	22	14
3.	8	11	3	11	12	12	1	10	19	12	22	14
4.	-	-	-	-	-	-	-	-	-	-	-	-
5.	7	11	11	15	3	10	4	14	25	14	14	12
6.	9	12	5	12	15	14	3	13	20	12	18	13
7.	8	11	8	14	12	12	7	16	29	15	15	12
8.	5	10	0	0	4	10	1	10	10	10	11	11
9.	8	11	1	10	14	13	1	10	18	12	12	11
10.	13	14	11	15	14	13	1	10	18	12	6	10
11.	15	15	20	17	16	14	14	22	35	18	37	18
12.	13	14	0	0	12	12	0	0	25	14	8	10
13.	17	16	5	12	12	12	4	14	25	14	18	13
14.	4	10	0	0	14	13	0	0	19	12	9	10
15.	13	14	7	14	13	13	6	16	28	15	31	17
16.	17	16	15	16	13	13	8	17	28	15	24	15
17.	19	17	20	17	20	17	13	21	39	20	37	18
18.	-	-	-	-	-	-	-	-	-	-	-	-
19.	15	15	15	16	8	11	7	16	33	17	33	17
20.	-	-	-	-	-	-	-	-	-	-	-	-
21.	11	13	20	17	17	15	3	13	25	14	20	14

Appendix

Individual Raw Data Collected for C_4 Group During 3 Years as Controls in Day Care Centers and Public Schools starting at Age 4 (Nursery School Level) Fall 1968 to Age 7 (Post First Grade Spring) 1971

Subject No.	STORIES Creativity Post K	Creativity Post 1st	Abstraction Post K	Abstraction Post 1st	Lang. Quality Post K	Lang. Quality Post 1st	No. Words Post K	No. Words Post 1st	No. Sentences Post K	No. Sentences Post 1st	Mean Length Post K	Mean Length Post 1st
1.	-	-	-	-	-	-	-	-	-	-	-	-
2.	2.5	1.0	2.5	1.0	3.0	1.0	34	17	4	1	7.0	2.43
3.	4.0	3.0	5.0	3.0	4.0	4.0	338	175	26	25	7.63	6.73
4.	2.0	-	2.5	-	2.5	-	43	-	4	-	8.40	-
5.	3.0	3.0	2.5	3.0	3.5	3.0	32	63	1	9	6.60	6.30
6.	4.0	4.0	5.0	3.0	3.5	4.0	81	43	6	6	5.50	6.14
7.	2.5	2.0	2.0	2.0	2.5	3.0	52	73	4	5	5.20	9.13
8.	2.0	3.0	1.5	3.0	2.0	2.5	25	56	3	11	4.40	4.00
9.	3.0	4.0	4.0	3.0	4.0	3.0	112	110	11	17	9.42	6.41
10.	4.0	1.5	5.0	2.0	3.5	2.0	217	76	16	7	7.72	3.80
11.	2.0	4.0	2.5	4.0	3.0	3.0	38	27	3	5	5.43	5.40
12.	3.5	4.0	4.0	4.0	3.0	3.0	72	39	7	5	7.20	4.88
13.	2.5	1.5	2.5	2.0	2.5	2.0	57	36	5	8	4.27	2.57
14.	3.0	4.0	3.0	4.0	2.5	4.0	56	53	3	6	6.88	6.63
15.	3.0	3.0	3.5	3.0	3.0	3.0	22	18	4	3	5.50	6.00
16.	4.0	3.0	4.0	3.0	3.0	3.0	66	50	4	4	9.43	12.50
17.	3.0	3.5	3.5	5.0	4.0	5.0	84	289	10	29	5.53	9.96
18.	2.0	-	2.0	-	2.0	-	31	-	4	-	4.00	-
19.	3.0	5.0	4.0	4.5	4.5	3.0	133	108	19	10	4.89	10.80
20.	4.0	3.0	4.5	4.0	3.5	3.0	42	22	4	4	8.00	5.50
21.	5.0	4.0	5.0	5.0	5.0	3.0	44	56	5	8	7.33	7.00

Appendix

Individual Raw Data Collected for C_4 Group During 3 Years as Controls in Day Care Centers and Public Schools starting at Age 4 (Nursery School Level) Fall 1968 to Age 7 (Post First Grade) Spring 1971

Subject No.	PICTURE STORY LANGUAGE TEST					
	Productivity			Abstract-Concrete		Syntax
	Total Words	Total Sentences	Words Per Sentences	Level Attained	Raw Score	Syntax Quotients
1.	-	-	-	-	-	-
2.	6	2	3.00	1	0	0
3.	9	3	3.00	3	7	70.00
4.	-	-	-	-	-	-
5.	0	0	0	1	0	0
6.	0	0	0	1	0	0
7.	14	5	2.80	2	7	48.98
8.	7	1	7.00	2	7	30.00
9.	0	0	0	1	0	0
10.	3	1	3.00	1	0	0
11.	22	5	4.40	2	7	76.04
12.	0	0	0	1	0	0
13.	2	1	2.00	1	0	0
14.	0	0	0	1	0	0
15.	13	2	6.50	3	7	81.43
16.	5	1	5.00	2	7	65.18
17.	34	5	6.80	2	7	76.80
18.	-	-	-	-	-	-
19.	9	1	9.00	2	7	70.60
20.	0	0	0	1	0	0
21.	8	3	2.67	1	0	55.55

Appendix

Individual Raw Data Collected for E_5 Group during 2 Years in Experimental Learning to Learn Program starting at Age 5 (Kindergarten Level) Fall, 1968, to Age 7 (Post First Grade), plus 1 Year in Public Schools to Age 8 (Post Second Grade) Spring 1971

Subject No.	Birthdate	BINET				ITPA			
		Pre K	Post K	Post 1st	Post 2nd	VE Pre K	VE Post K	VE Post 1st	VE Post 2nd
1.	6/23/63	91	102	-	87	9	15	-	19
2.	11/9/63	98	120	117	112	11	19	15	17
3.	4/5/63	96	106	120	119	10	14	17	16
4.	8/31/63	105	117	125	128	9	9	17	13
5.	7/3/63	82	91	-	92	7	11	-	18
6.	5/15/63	82	86	84	-	13	10	14	-
7.	8/3/63	105	103	114	116	10	7	20	20
8.	2/14/63	68	86	81	76	14	17	14	12
9.	12/15/63	90	96	-	-	10	10	-	-
10.	8/23/63	78	100	100	100	10	9	15	16
11.	8/31/63	100	112	121	120	6	12	14	14
12.	2/28/63	84	91	92	74	10	11	13	11
13.	11/21/63	99	105	104	107	8	13	15	10
14.	2/15/63	98	104	132	118	10	12	21	23
15.	8/13/63	92	105	120	120	8	12	18	18
16.	5/16/63	89	100	118	115	15	18	13	17
17.	4/27/63	93	108	120	98	4	13	17	19
18.	3/22/63	79	78	78	72	9	12	15	11
19.	2/15/63	78	82	81	99	12	8	24	23
20.	12/11/63	84	91	-	90	5	19	-	14
21.	7/14/63	93	92	98	102	5	16	20	14

Appendix

Individual Raw Data Collected for E_5 Group during 2 Years in Experimental Learning to Learn Program starting at Age 5 (Kindergarten Level) Fall, 1968, to Age 7 (Post First Grade), plus 1 Year in Public Schools to Age 8 (Post Second Grade) Spring 1971

Subject No.	VD Post K	VD Post 1st	VD Post 2nd	ITPA AVA Pre K	ITPA AVA Post K	ITPA AVA Post 1st	ITPA AVA Post 2nd	ITPA VMA Post K	ITPA VMA Post 1st	ITPA VMA Post 2nd
1.	14	-	15	8	22	-	23	15	-	19
2.	10	11	12	9	19	20	23	15	18	21
3.	12	13	18	11	21	22	22	16	23	23
4.	8	17	-	14	10	22	23	7	15	-
5.	14	-	12	7	12	-	18	12	-	12
6.	11	10	-	7	14	19	-	19	17	-
7.	9	16	17	11	18	20	22	19	15	21
8.	12	10	8	6	13	7	22	18	20	16
9.	15	-	-	10	8	-	16	13	-	-
10.	14	14	14	6	14	20	20	13	19	14
11.	11	14	17	7	18	21	22	11	15	12
12.	7	12	12	4	12	17	19	14	21	21
13.	10	10	12	7	16	21	24	17	13	22
14.	16	15	15	11	17	23	24	15	15	22
15.	15	13	15	9	17	21	22	14	19	24
16.	7	12	-	12	18	22	19	16	15	20
17.	10	16	16	8	19	20	20	20	17	24
18.	12	10	12	6	10	17	18	19	17	24
19.	12	15	17	8	16	20	21	16	16	20
20.	13	-	9	4	13	-	18	13	-	10
21.	7	13	16	8	14	19	19	17	14	22

Appendix

Individual Raw Data Collected for E_5 Group during 2 Years in Experimental Learning to Learn Program starting at Age 5 (Kindergarten Level) Fall, 1968, to Age 7 (Post First Grade), plus 1 Year in Public Schools to Age 8 (Post Second Grade) Spring, 1971

Subject No.	BENDER			PRIMARY MENTAL ABILITIES TEST									
				Verbal		Percept.		Number		Spatial		Total	
	Post K	Post 1st	Post 2nd	Post 1st	Post 2nd	Post 1st	Post 2nd	Post 1st	Post 2nd	Post 1st	Post 2nd	Post 1st	Post 2nd
1.	13	-	4	-	43	-	21	-	14	-	13	-	91
2.	13	5	2	38	40	22	25	22	30	15	13	97	108
3.	11	6	1	41	46	28	28	23	38	17	15	109	127
4.	7	6	6	42	36	19	21	21	31	18	10	100	98
5.	8	-	3	-	36	-	17	-	8	-	7	-	68
6.	14	10	-	37	-	23	-	16	-	12	-	88	-
7.	9	7	9	25	42	22	17	23	36	20	13	90	108
8.	9	8	6	32	-	24	-	17	-	18	-	91	-
9.	11	-	-	-	-	-	-	-	-	-	-	-	-
10.	14	8	9	36	37	18	19	15	18	18	16	87	90
11.	12	4	6	37	37	18	26	19	26	19	9	93	98
12.	10	7	2	24	36	21	15	17	21	18	13	80	85
13.	17	3	5	35	37	18	21	18	29	16	15	87	102
14.	10	9	6	39	44	26	36	26	42	21	19	112	141
15.	9	3	6	36	38	23	16	21	29	18	17	98	100
16.	12	7	2	38	43	26	31	25	41	21	19	110	134
17.	11	3	3	39	40	24	25	21	26	19	15	103	106
18.	17	13	6	25	28	23	22	14	12	7	8	69	70
19.	13	6	7	22	28	26	22	19	16	19	17	86	83
20.	16	-	4	-	25	-	27	-	14	-	8	-	74
21.	15	7	5	33	31	18	13	17	32	13	13	81	89

Individual Raw Data Collected for E_5 Group during 2 Years in Experimental Learning to Learn Program starting at Age 5 (Kindergarten Level) Fall, 1968 to Age 7 (Post First Grade) plus 1 Year in Public Schools to Age 8 (Post Second Grade) Spring 1971

Subject No.	SRST		SPACHE DIAGNOSTIC READING SCALES		
			Word Recognition	Instructional	Potential
	Pre K	Post K	Post 2nd	Post 2nd	Post 2nd
1.	14	21	-	-	-
2.	14	21	3.8	3.8	4.5
3.	14	23	3.3	3.8	4.5
4.	13	20	2.8	4.5	4.5
5.	9	14	-	-	-
6.	6	15	-	-	-
7.	15	18	3.3	3.8	3.8
8.	8	15	1.8	1.0	1.0
9.	10	11	-	-	-
10.	9	19	2.3	1.8	4.5
11.	12	24	3.9	3.8	3.8
12.	7	14	2.9	2.8	2.8
13.	11	22	1.8	3.3	3.3
14.	13	28	4.5	4.5	3.8
15.	13	27	3.3	2.8	3.3
16.	12	20	3.8	3.8	3.3
17.	16	25	3.8	3.3	3.8
18.	9	12	4.5	3.3	2.8
19.	3	16	2.3	2.3	4.5
20.	3	16	1.7	1.6	1.3
21.	11	22	4.5	3.8	2.8

Individual Raw Data Collected for E_5 Group during 2 Years in Experimental Learning to Learn Program starting at Age 5 (Kindergarten Level) Fall, 1968 to Age 7 (Post First Grade) plus 1 Year in Public Schools to Age 8 (Post Second Grade) Spring, 1971

Subject No.	WISC VERBAL TESTS											
	Inf.		Comp.		Arith.		Sim.		Vocab.		IQ	
	Post RS	2nd SS	Post RS	2nd SS	Post RS	2nd SS	Post RS	2nd SS	Post RS	2nd SS	Post	2nd
1.	6	6	10	12	5	8	8	12	17	7	94	
2.	10	12	9	11	6	11	8	13	16	7	121	
3.	12	13	10	11	8	13	10	14	29	13	118	
4.	11	13	9	11	8	14	12	16	24	12	120	
5.	8	8	5	7	6	10	7	11	19	8	92	
6.	-	-	-	-	-	-	-	-	-	-	-	
7.	10	11	11	13	7	12	12	16	24	10	115	
8.	6	5	7	7	4	6	3	6	15	6	75	
9.	-	-	-	-	-	-	-	-	-	-	-	
10.	10	9	7	8	5	8	9	13	21	9	96	
11.	9	10	11	13	6	10	8	12	21	9	105	
12.	8	8	8	9	6	9	10	14	13	5	94	
13.	8	9	9	11	8	15	8	13	20	9	109	
14.	13	15	12	14	9	15	9	13	23	10	121	
15.	12	15	8	9	8	14	7	12	23	10	115	
16.	9	9	10	11	7	11	9	13	20	8	103	
17.	10	11	6	7	8	13	7	11	20	8	100	
18.	7	7	8	9	6	9	5	8	11	4	84	
19.	8	8	10	11	4	6	6	9	21	9	91	
20.	8	9	8	10	5	9	8	13	16	7	97	
21.	10	11	8	9	7	12	4	8	20	8	97	

Individual Raw Data Collected for E_5 Group, during 2 Years in Experimental Learning to Learn Program starting at Age 5 (Kindergarten Level) Fall, 1968, to Age 7 (Post First Grade), plus 1 Year in Public Schools to Age 8 (Post Second Grade) Spring, 1971

Subject No.	TEACHER's RATINGS																				
	Effort			Persistence			Goal			Independence			Failure			Total		
	Post			Post			Post			Post			Post			Post		
	K	1st	2nd	K	1st	2nd	K	1st	2nd	K	1st	2nd	K	1st	2nd	K	1st	2nd
1.	-	-	2	-	-	2	-	-	2	-	-	2	-	-	3	-	-	11
2.	4	4	4	4	3	4	4	3	4	3	3	3	3	3	3	18	16	18
3.	4	4	3	4	4	3	3	4	3	3	3	3	3	3	3	17	19	15
4.	4	4	3	4	3	3	3	4	3	3	3	3	3	3	3	17	17	15
5.	4	-	1	2	-	1	1	-	1	2	-	2	2	-	2	11	-	7
6.	2	1	-	2	2	-	2	2	-	2	2	-	2	2	-	10	9	-
7.	4	3	2	4	3	2	4	3	2	4	2	2	4	1	2	20	12	10
8.	4	1	2	3	1	2	2	2	1	3	1	2	2	1	2	14	6	9
9.	2	-	-	2	-	-	3	-	-	2	-	-	2	-	-	11	-	-
10.	2	4	2	2	3	1	3	2	1	2	3	1	2	2	2	11	14	7
11.	3	3	4	3	4	4	4	3	3	3	3	3	3	2	3	16	15	17
12.	4	3	4	3	3	3	2	2	2	4	2	2	2	2	2	15	12	13
13.	3	4	2	3	3	2	3	2	2	3	3	2	3	1	2	15	13	10
14.	4	4	3	4	4	3	4	4	3	4	3	3	4	4	3	20	19	15
15.	3	2	2	2	2	1	3	2	2	2	2	1	3	2	1	13	10	7
16.	3	3	2	2	3	2	4	3	3	4	3	2	3	3	3	16	15	12
17.	3	3	3	4	2	3	4	3	3	3	1	3	3	2	3	17	11	15
18.	4	4	3	3	3	2	3	2	2	3	3	2	2	3	3	15	15	12
19.	4	4	4	2	3	4	3	2	4	2	3	4	2	3	4	13	15	20
20.	3	-	-	2	-	-	1	-	-	2	-	-	2	-	-	10	-	-
21.	3	3	3	3	3	3	3	3	3	3	3	2	2	3	2	14	15	13

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Appendix

Individual Raw Data Collected for E_5 Group, during 2 Years in Experimental Learning to Learn Program starting at Age 5 (Kindergarten Level) Fall, 1968, to Age 7 (Post First Grade) Spring, 1970

Subject No.	METROPOLITAN READINESS TEST						
	Word Meaning # Right Pre 1st	Listening # Right Pre 1st	Matching # Right Pre 1st	Alphabet # Right Pre 1st	Numbers # Right Pre 1st	Copying # Right Pre 1st	Total # Right Pre 1st
1.	-	-	-	-	-	-	-
2.	9	13	8	16	22	9	77
3.	8	10	10	16	16	8	68
4.	5	12	10	16	14	9	66
5.	-	-	-	-	-	-	-
6.	7	11	9	12	7	7	43
7.	7	11	12	16	16	9	71
8.	5	9	8	15	12	6	55
9.	-	-	-	-	-	-	-
10.	8	12	6	16	12	6	60
11.	8	9	9	16	13	9	64
12.	8	14	5	16	7	8	58
13.	5	14	5	16	17	5	62
14.	11	13	10	16	20	10	80
15.	8	12	7	16	16	5	64
16.	5	12	10	16	17	9	69
17.	7	12	13	15	19	4	70
18.	5	9	9	16	11	6	56
19.	5	10	8	15	17	11	66
20.	-	-	-	-	-	-	-
21.	4	12	9	16	14	4	59

Appendix

Individual Raw Data Collected for E_5 Group, during 2 Years in Experimental Learning to Learn Program starting at Age 5 (Kindergarten Level) Fall, 1968, to Age 7 (Post 1st Grade) Spring, 1970

Subject No	Stanford Achievement Test											
	Word		Paragraph		Vocabulary		Spelling		Wd.Study Skill		Arithmetic	
	# Right	Reading Grade Score	# Right	Grade Score	# Right	Grade Score	# Right	Grade Score	# Right	Grade Score	# Right	Grade Score
	1st		1st		1st		1st		1st		1st	
1.	-	-	-	-	-	-	-	-	-	-	-	-
2.	16	16	10	15	20	18	18	30	36	17	53	27
3.	15	15	13	16	28	26	12	21	27	14	51	26
4.	22	19	24	21	16	15	17	26	43	25	50	25
5.	-	-	-	-	-	-	-	-	-	-	-	-
6.	11	13	10	15	19	17	11	20	28	14	33	17
7.	17	16	19	18	15	14	17	26	30	15	50	25
8.	8	11	10	15	0	0	5	15	25	13	33	17
9.	-	-	-	-	-	-	-	-	-	-	-	-
10.	12	14	8	14	11	12	11	20	27	14	47	23
11.	19	17	17	17	23	21	18	30	34	17	46	23
12.	9	12	17	17	14	14	14	23	25	13	36	18
13.	12	14	11	15	13	13	11	20	35	18	51	26
14.	28	24	31	26	24	22	20	34	49	34	58	31
15.	18	17	13	16	17	15	10	19	30	15	57	30
16.	16	16	14	16	26	24	11	20	40	22	53	27
17.	23	20	19	18	23	21	19	34	38	20	54	27
18.	18	17	15	16	17	15	16	25	28	14	29	16
19.	15	15	12	15	17	15	13	22	31	15	43	21
20.	-	-	-	-	-	-	-	-	-	-	-	-
21.	25	22	24	20	18	16	18	30	35	18	44	22

Appendix

Individual Raw Data Collected for E_5 Group during 2 Years in Experimental Learning to Learn Program starting at Age 5 (Kindergarten Level) Fall, 1968 to Age 7 (Post First Grade) plus 1 Year in Public Schools to Age 8 (Post Second Grade) Spring, 1971

Subject No.	STANFORD ACHIEVEMENT TEST - PRIMARY II							
	Word Meaning Gr. Score Post-2nd	Paragraph Meaning Gr. Score Post 2nd	Science & Soc. Studies Gr. Score Post-2nd	Spelling Gr. Score Post-2nd	Word Study Gr.Score Post-2nd	Language Gr. Score Post-2nd	Arith. Comp. Gr.Score Post-2nd	Arith. Concept Gr.Score Post-2nd
1.	20	19	22	20	20	32	18	21
2.	29	21	33	26	24	25	24	25
3.	28	27	40	30	24	24	30	29
4.	28	31	38	33	25	32	29	32
5.	17	17	26	0	17	27	16	15
6.	-	-	-	-	-	-	-	-
7.	31	23	22	23	18	24	31	21
8.	-	-	-	-	-	-	-	-
9.	-	-	-	-	-	-	-	-
10.	25	22	20	20	16	21	17	15
11.	26	21	17	25	17	28	25	26
12.	20	19	20	26	13	21	19	20
13.	18	10	24	23	36	22	25	27
14.	35	30	31	39	29	27	37	45
15.	21	15	43	23	31	19	23	27
16.	27	25	27	34	35	24	26	33
17.	27	17	13	26	20	25	32	20
18.	23	20	24	35	16	18	17	21
19.	27	15	27	24	16	30	16	24
20.	18	11	16	13	13	11	11	25
21.	26	29	31	36	20	28	27	31

Individual Raw Data Collected for E_5 Group During 3 Years in Experimental Learning to Learn Program starting at Age 5 (Kindergarten Level) Fall 1968, to Age 8 (Post 2nd Grade) Spring 1971

Subject No.	Creativity		Abstraction		STORIES Lang.		No. Words		No. Sentences		Mean Length	
	Post 1st	Post 2nd	Post 1st	Post 2nd	Post 1st	Quality Post 2st	Post 1st	Post 2nd	Post 1st	Post 2nd	Post 1st	Post 2nd
1.	-	3.0	-	3.0	-	3.0	-	52	-	10	-	5.20
2.	3.5	6.0	4.0	6.0	3.5	5.5	40	89	7	11	4.44	8.09
3.	6.0	6.0	5.5	6.0	5.0	5.5	167	252	6	15	18.00	16.80
4.	5.0	5.0	5.5	5.0	5.0	5.0	112	80	6	8	12.89	10.00
5.	-	3.0	-	4.0	-	4.0	-	108	-	12	-	8.30
6.	2.5	-	3.0	-	3.0	-	29	-	4	-	4.67	-
7.	5.5	6.0	6.0	5.0	4.5	4.0	114	70	7	8	14.63	8.75
8.	2.0	4.0	2.5	4.0	2.0	3.0	19	34	1	5	3.80	6.80
9.	-	-	-	-	-	-	-	-	-	-	-	-
10.	4.5	5.5	5.0	6.0	3.0	5.0	77	123	4	10	10.71	12.30
11.	3.5	5.5	4.0	5.0	4.0	4.0	76	112	5	10	12.67	11.20
12.	5.0	4.0	5.5	4.0	3.5	3.0	240	85	17	11	10.26	7.72
13.	3.5	4.0	4.0	5.0	3.5	3.0	68	27	6	3	6.80	9.00
14.	4.5	5.0	5.0	5.0	4.5	5.0	136	143	9	10	14.44	14.30
15.	2.0	4.0	3.0	4.0	3.0	4.0	50	135	4	9	6.25	15.00
16.	4.0	6.0	4.5	6.0	3.5	5.0	92	138	6	12	13.14	11.50
17.	2.5	4.0	3.0	5.0	3.0	3.0	46	99	2	9	6.57	11.00
18.	4.0	4.0	4.5	4.0	4.0	3.5	60	78	5	5	8.29	11.14
19.	5.5	4.0	6.0	5.0	5.5	4.0	201	63	14	6	11.94	9.00
20.	-	4.0	-	4.0	-	4.0	-	26	-	4	-	6.50
21.	3.5	5.0	4.0	4.0	3.0	4.0	59	82	4	7	9.67	11.71

Appendix

Individual Raw Data Collected for E_5 Group during 2 Years in Experimental Learning to Learn Program starting at Age 5 (Kindergarten Level) Fall 1968 to Age 7 (Post First Grade) plus 1 Year in Public Schools to Age 8 (Post Second Grade) Spring 1971

	PICTURE STORY LANGUAGE TEST					
		Productivity		Abstract-Concrete		Syntax
Subject No.	Total Words	Total Sentences	Words Per Sentences	Level Attained	Raw Score	Syntax Quotients
1.	32	4	8.00	3	9	69.44
2.	15	1	15.00	3	10	86.66
3.	103	14	7.36	4	20	95.84
4.	21	5	4.20	4	13	86.95
5.	-	-	-	-	-	-
6.	-	-	-	-	-	-
7.	35	3	11.67	3	7	78.14
8.	18	3	6.00	1	0	87.46
9.	-	-	-	-	-	-
10.	12	1	12.00	3	7	82.52
11.	23	3	7.67	3	7	78.09
12.	25	3	8.33	3	7	81.80
13.	24	3	8.00	3	7	90.42
14.	60	6	10.00	4	17	86.84
15.	34	6	5.67	3	8	93.40
16.	33	5	6.60	3	10	83.04
17.	26	3	8.67	4	20	91.47
18.	54	8	6.75	3	7	84.06
19.	28	4	7.00	4	13	80.00
20.	15	5	3.00	2	1	60.00
21.	35	6	5.86	3	7	74.35

Appendix

Individual Raw Data Collected for C_5 Group during 3 Years as Controls in Public Schools starting at Age 5 (Kindergarten Level) Fall,1968 to Age 8 (Post Second Grade) Spring, 1971 A-32

Subject No.	Birthdate	BINET				ITPA			
		Pre K	Post K	Post 1st	Post 2nd	VE Pre K	VE Post K	VE Post 1st	VE Post 2nd
1.	9/28/63	87	78	104	101	·8	13	26	15
2.	3/1/63	97	93	87	102	19	11	11	17
3.	5/2/63	86	99	85	03	7	10	14	18
4.	11/6/63	98	98	110	82	11	11	20	13
5.	7/14/63	80	79	76	64	11	11	9	14
6.	3/4/63	88	60	83	78	9	11	10	10
7.	12/20/63	99	88	94	98	9	14	15	13
8.	1/10/63	77	78	78	83	5	7	14	16
9.	12/28/63	94	93	-	-	3	9	-	-
10.	12/26/63	79	91	94	87	8	13	12	15
11.	5/29/63	93	77	86	89	7	14	13	20
12.	2/5/63	97	96	89	99	16	15	17	18
13.	6/1/63	93	81	81	76	13	17	22	14
14.	9/16/63	98	92	94	101	13	22	16	12
15.	8/26/63	91	87	82	82	8	9	10	19
16.	6/13/63	103	111	82	110	13	18	13	17
17.	5/7/63	88	96	89	89	7	11	12	16
18.	8/13/63	98	110	82	89	14	19	16	23
19.	12/11/63	79	91	77	73	4	14	7	17
20.	12/20/63	82	86	81	79	8	13	14	13
21.	7/3/63	75	63	69	78	8	13	7	13

Appendix

Individual Raw Data Collected for C_5 Group during 3 Years as Controls in Public Schools starting at Age 5 (Kindergarten Level) Fall, 1968 to Age 8 (Post Second Grade) Spring, 1971

Subject No.	ITPA VD Post K	VD Post 1st	VD Post 2nd	AVA Pre K	AVA Post K	AVA Post 1st	AVA Post 2nd	VMA Post K	VMA Post 1st	VMA Post 2nd
1.	11	11	16	6	11	17	16	13	19	21
2.	10	15	16	12	19	20	20	15	18	16
3.	13	11	16	9	13	18	20	14	17	14
4.	15	14	-	10	13	17	20	19	20	-
5.	7	10	16	5	9	12	16	14	13	20
6.	12	13	-	7	11	11	17	10	19	-
7.	11	12	15	10	15	15	20	12	10	14
8.	13	13	17	5	12	14	17	13	14	18
9.	7	-	-	7	11	-	-	11	-	-
10.	6	7	16	6	12	15	19	17	22	19
11.	10	10	14	6	16	19	19	13	16	18
12.	13	18	15	13	16	17	20	17	14	23
13.	7	10	13	4	10	14	15	11	10	18
14.	10	14	18	14	14	17	19	9	23	20
15.	7	14	11	9	14	14	18	11	12	13
16.	15	12	13	14	20	21	20	18	20	9
17.	16	15	21	9	17	21	20	14	18	18
18.	6	6	17	13	14	18	19	13	12	19
19.	10	14	9	5	10	9	15	11	12	14
20.	8	8	17	5	11	13	16	12	7	15
21.	12	8	11	0	6	1	12	11	9	18

Appendix

Individual Raw Data Collected for C_5 Group during 3 Years as Controls in Public Schools starting at Age 5 (Kindergarten Level) Fall, 1968 to Age 8 (Post Second Grade) Spring, 1971

Subject No.	BENDER			PRIMARY MENTAL ABILITIES TEST									
				Verbal		Percept.		Number		Spatial		Total	
	Post K	Post 1st	Post 2nd	Post 1st	Post 2nd	Post 1st	Post 2nd	Post 1st	Post 2nd	Post 1st	Post 2nd	Post 1st	Post 2nd
1.	22	9	5	29	23	20	11	15	9	17	10	81	53
2.	3	1	0	36	41	25	33	21	28	23	20	105	122
3.	23	7	8	35	32	19	28	21	23	18	14	93	97
4.	18	13	12	42	35	15	4	12	8	18	14	87	61
5.	18	15	16	27	25	6	11	5	4	8	6	46	46
6.	21	10	6	22	23	13	12	9	10	14	13	58	58
7.	19	6	11	18	18	15	13	14	23	10	13	57	67
8.	14	4	7	34	29	23	21	20	15	18	17	95	82
9.	17	-	-	-	-	-	-	-	-	-	-	-	-
10.	16	11	9	33	33	18	13	17	11	14	12	82	69
11.	19	10	4	21	29	13	26	17	22	16	11	67	88
12.	15	2	4	37	40	21	24	17	33	20	10	95	107
13.	14	13	6	19	34	18	19	13	11	11	13	61	77
14	15	12	10	31	36	19	7	13	11	13	14	76	68
15.	13	10	6	29	27	14	8	15	4	7	6	65	45
16.	9	3	7	37	35	22	34	24	39	19	14	102	122
17.	12	5	3	33	34	24	29	24	27	21	22	102	112
18.	22	12	10	31	29	17	19	19	9	8	10	75	67
19.	24	12	14	19	24	19	1	5	5	7	6	50	36
20.	13	16	13	29	27	12	20	11	7	10	13	62	67
21.	19	10	10	20	20	15	14	7	5	8	10	50	49

Individual Raw Data Collected for C_5 Group during 3 Years as Controls in Public Schools starting at Age 5 (Kindergarten Level) Fall, 1968 to Age 8 (Post Second Grade) Spring 1971

Subject No.	SRST		SPACHE DIAGNOSTIC READING SCALES		
			Word Recognition	Instructional	Potential
	Pre K	Post K	Post 2nd	Post 2nd	Post 2nd
1.	8	15	1.6	1.0	2.8
2.	8	19	3.8	3.8	3.8
3.	18	24	1.8	1.6	4.5
4.	11	15	1.0	1.0	3.3
5.	7	10	1.0	1.0	1.0
6.	8	15	1.0	1.0	1.0
7.	10	13	1.8	1.0	1.0
8.	11	14	2.0	1.8	4.5
9.	10	19	-	-	-
10.	7	10	1.3	1.0	1.0
11.	10	15	2.8	2.3	2.8
12.	16	23	3.4	3.3	3.8
13.	10	14	1.8	1.8	2.8
14.	10	13	4.5	4.5	4.5
15.	6	20	1.0	1.0	2.3
16.	16	24	6.4	4.5	5.5
17.	13	20	2.3	2.3	4.5
18.	12	18	1.3	1.6	4.5
19.	6	12	1.0	1.0	2.3
20.	9	12	1.0	1.0	2.3
21.	9	12	2.0	1.6	1.0

Appendix

Individual Raw Data Collected for C_5 Group during 3 Years as Controls in Public Schools starting at Age 5 (Kindergarten Level) Fall, 1968 to Age 8 (Post Second Grade) Spring, 1971

Subject No.	WISC VERBAL TESTS										
	Inf.		Comp.		Arith.		Sim.		Vocab.		VIQ
	Post RS	2nd SS	Post RS	2nd SS	Post RS	2nd SS	Post RS	2nd SS	Post RS	2nd SS	Post 2nd
1.	7	7	9	11	5	8	4	8	19	8	90
2.	6	5	8	9	6	9	6	9	22	9	89
3.	8	8	6	7	5	7	6	9	20	8	86
4.	7	8	7	9	4	7	4	8	13	6	85
5.	8	8	5	7	4	6	7	11	11	4	82
6.	7	7	7	8	5	7	8	12	14	5	86
7.	9	11	4	6	6	11	7	12	12	5	94
8.	7	6	8	8	5	6	4	7	15	6	79
9.	-	-	-	-	-	-	-	-	-	-	-
10.	7	8	5	7	6	11	4	8	8	3	84
11.	7	7	8	9	6	10	6	10	16	7	91
12.	7	7	3	4	7	11	8	12	16	6	87
13.	7	7	8	9	6	10	6	10	12	5	89
14.	8	8	2	4	5	8	8	12	16	7	86
15.	9	10	2	4	5	8	6	10	17	7	86
16.	8	8	9	11	7	12	7	11	15	7	99
17.	10	11	7	8	8	13	7	11	15	6	99
18.	9	10	10	12	6	10	9	13	13	6	101
19.	7	8	5	7	4	7	6	10	14	6	85
20.	6	6	5	7	5	9	3	6	12	5	79
21.	7	7	6	7	5	8	4	8	15	7	84

Appendix

Individual Raw Data Collected for C_5 Group during 3 Years as Controls in Public Schools starting at Age 5 (Kindergarten Level) Fall, 1968 to Age 8 (Post Second Grade) Spring, 1971

Subject No.	TEACHER'S RATINGS																		
	Effort			Persistence			Goal			Independence			Failure			Total		
	K	Post 1st	Post 2nd	K	Post 1st	Post 2nd	K	Post 1st	Post 2nd	K	Post 1st	Post 2nd	K	Post 1st	Post 2nd	K	Post 1st	Post 2nd
1.	3	2	2	2	2	3	2	2	2	2	2	2	2	3	3	11	11	12
2.	4	4	4	4	4	4	4	4	3	4	4	3	3	3	3	19	19	17
3.	4	4	3	4	4	3	3	4	3	3	4	3	4	3	2	18	19	14
4.	1	2	1	1	2	1	1	2	1	1	2	1	1	3	1	5	11	5
5.	2	2	2	2	2	2	2	2	1	2	2	2	2	3	1	10	11	8
6.	3	2	2	3	2	2	2	2	1	3	2	2	3	3	1	14	11	8
7.	3	4	3	3	4	3	2	4	3	2	4	2	2	3	2	12	19	13
8.	3	4	2	3	4	2	3	4	3	3	4	3	2	3	3	14	19	13
9.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10.	1	4	1	1	4	1	1	4	1	1	4	1	1	3	1	5	19	5
11.	2	4	3	1	4	4	2	4	3	3	4	3	3	3	2	11	19	15
12.	4	4	4	4	4	3	4	4	3	4	4	4	3	3	2	19	19	16
13.	3	4	1	3	4	1	3	4	1	2	4	1	1	3	1	12	19	5
14.	4	4	2	4	4	2	4	4	2	3	4	2	3	3	2	18	19	10
15.	1	2	1	1	2	1	1	2	1	2	2	2	3	3	1	8	11	6
16.	4	3	4	4	4	4	4	3	4	3	4	4	3	4	3	18	18	19
17.	4	4	4	4	4	4	4	4	4	4	4	4	4	3	3	20	19	19
18.	2	2	1	2	2	2	2	2	1	2	2	1	3	3	1	11	11	6
19.	2	2	1	2	2	1	2	2	1	2	2	1	1	3	2	9	11	6
20.	3	2	-	3	2	-	3	2	-	2	2	-	1	3	-	12	11	-
21.	2	4	3	1	4	3	2	4	3	1	4	2	1	3	2	7	19	13

Appendix

Individual Raw Data Collected for C_5 Group: during
2 Years as Controls in Public Schools starting at Age 5
(Kindergarten Level) Fall, 1968 to Age 7 (Post 1st Grade) Spring, 1970

Subject No.	Metropolitan Readiness Test						
	Word Meaning # Right Pre 1st	Listening # Right Pre 1st	Matching # Right Pre 1st	Alphabet # Right Pre 1st	Numbers # Right Pre 1st	Copying # Right Pre 1st	Total # Right Pre 1st
1.	6	7	3	3	4	5	28
2.	10	13	14	11	10	14	69
3.	7	6	4	4	10	5	36
4.	5	13	7	1	5	1	32
5.	3	4	2	3	7	2	20
6.	6	4	4	5	6	1	26
7.	6	4	3	5	8	2	28
8.	5	6	11	6	8	8	44
9.	-	-	-	-	-	-	-
10.	6	6	3	4	8	0	27
11.	4	7	6	7	10	6	40
12.	4	10	6	14	12	7	53
13.	5	3	4	4	9	0	25
14.	1	9	7	12	7	4	40
15.	7	6	3	4	4	1	25
16.	6	8	11	15	15	8	63
17.	7	10	12	11	12	12	64
18.	3	9	2	4	8	0	26
19.	7	7	4	3	3	2	26
20.	4	9	7	2	7	0	29
21.	7	8	3	8	7	0	33

Appendix
Individual Raw Data Collected for C_5 Group; during
2 Years as Controls in Public Schools starting at Age 5
(Kindergarten Level) Fall, 1968 to Age 7 (Post 1st Grade) Spring, 1970

Subject No.	Stanford Achievement Test											
	Word Reading		Paragraph		Vocabulary		Spelling		Wd.Study Skill		Arithmetic	
	# Right	Grade Score	# Right	Grade Score	# Right	Grade Score	# Right	Grade Score	# Right	Grade Score	# Right	Grade Score
	1st		1st		1st		1st		1st		1st	
1.	11	13	8	14	19	16	0	10	19	12	12	11
2.	19	17	15	16	27	25	7	16	39	20	43	21
3.	5	12	11	15	9	11	2	12	15	11	21	14
4.	2	12	7	14	16	14	3	10	21	13	14	12
5.	9	12	5	12	10	12	0	10	15	11	9	11
6.	-	-	-	-	-	-	-	-	-	-	-	-
7.	9	12	7	14	15	14	0	13	22	13	19	14
8.	9	12	5	12	18	15	0	10	21	13	27	16
9.	-	-	-	-	-	-	-	-	-	-	-	-
10.	11	13	2	12	13	13	0	10	17	12	8	11
11.	8	12	5	12	9	11	3	13	26	14	23	15
12.	13	14	14	16	20	17	5	15	16	11	37	18
13.	7	12	4	12	9	11	2	12	19	12	19	14
14.	14	15	7	14	19	16	6	16	25	14	23	15
15.	12	14	5	12	12	12	0	10	10	11	7	11
16.	29	24	36	31	25	23	20	34	56	55	57	29
17.	12	14	16	16	13	13	4	14	16	11	42	20
18.	3	12	9	15	12	12	0	10	28	15	11	11
19.	7	12	2	11	9	11	0	10	20	12	15	12
20.	9	12	3	12	13	13	0	10	17	12	9	11
21.	10	13	5	12	13	13	2	12	21	13	12	11

Appendix

Individual Raw Data Collected for C_5 Group during 3 Years as Controls in Public Schools starting at Age 5 (Kindergarten Level) Fall, 1968 to Age 8 (Post Second Grade) Spring 1971

Subject No.	STANFORD ACHIEVEMENT TEST - PRIMARY II							
	Word Meaning Gr. Score Post-2nd	Paragraph Meaning Gr. Score Post-2nd	Science & Soc. Studies Gr. Score Post-2nd	Spelling Gr. Score Post-2nd	Word Study Gr.Score Post-2nd	Language Gr.Score Post-2nd	Arith. Comp. Gr. Score Post-2nd	Arith. Concept Gr.Score Post-2nd
1.	18	17	13	0	25	19	13	14
2.	23	18	17	26	24	23	26	20
3.	20	21	26	17	34	29	30	21
4.	18	15	20	13	11	20	16	17
5.	18	15	14	13	17	11	11	16
6.	17	11	18	13	11	27	15	13
7.	21	17	24	15	17	36	26	15
8.	19	17	24	13	20	25	26	17
9.	-	-	-	-	-	-	-	-
10.	12	15	20	15	20	26	20	16
11.	23	17	26	20	19	23	18	26
12.	25	24	29	25	26	21	23	26
13.	20	k6	20	0	17	0	0	17
14.	27	24	14	40	24	26	19	15
15.	0	0	22	0	0	17	18	0
16.	30	31	18	52	40	38	38	33
17.	23	17	18	15	23	23	30	21
18.	12	15	16	0	15	24	15	15
19.	17	0	10	13	16	14	12	14
20.	16	17	15	15	16	25	10	21
21.	18	14	18	17	13	20	18	11

Individual Raw Data Collected for C_5 Group During 3 Years as Controls in Public Schools starting at Age 5 (Kindergarten Level) Fall 1968, to Age 8 (Post 2nd Grade) Spring 1971

Subject No.	STORIES Creativity Post 1st	Creativity Post 2nd	Abstraction Post 1st	Abstraction Post 2nd	Lang. Quality Post 1st	Lang. Quality Post 2nd	No. Words Post 1st	No. Words Post 2nd	No. Sentences Post 1st	No. Sentences Post 2nd	Mean Length Post 1st	Mean Length Post 2nd
1.	4.5	4.0	4.5	5.0	3.5	4.0	68	95	5	7	10.43	9.50
2.	5.0	5.0	5.0	5.0	3.0	4.0	22	83	1	7	11.00	11.86
3.	3.0	3.0	3.0	4.0	3.5	4.0	47	39	3	5	7.83	7.95
4.	3.0	4.5	3.0	5.0	3.0	5.0	67	49	6	5	6.18	7.00
5.	3.0	4.0	3.5	3.0	3.5	2.0	16	41	2	7	8.50	4.56
6.	2.0	2.0	2.5	4.0	2.5	3.0	40	94	3	11	2.63	6.27
7.	3.5	3.0	4.5	3.0	3.5	3.0	104	85	7	12	9.60	6.07
8.	3.0	3.0	3.5	4.0	3.0	3.5	24	45	2	5	4.80	9.00
9.	-	-	-	-	-	-	-	-	-	-	-	-
10.	1.0	3.0	1.0	3.0	1.0	2.0	17	31	0	3	5.67	10.33
11.	2.0	3.0	3.5	4.0	3.0	3.0	72	35	6	5	6.27	4.37
12.	5.5	3.0	5.5	3.0	5.0	3.0	72	45	5	5	15.60	6.43
13.	4.0	3.5	4.0	4.0	3.0	3.0	67	80	3	9	8.38	8.88
14.	2.5	3.0	3.0	3.5	3.0	3.0	48	46	4	6	8.17	6.57
15.	4.0	3.0	4.5	4.0	4.0	3.0	25	46	4	9	6.25	5.11
16.	2.0	3.5	3.0	4.0	3.0	3.5	37	60	4	9	5.29	6.67
17.	4.5	5.0	4.5	5.0	4.0	5.0	58	104	3	11	19.33	8.67
18.	4.0	3.0	5.0	4.0	4.5	3.0	110	163	6	26	8.38	6.04
19.	2.5	2.0	4.5	2.0	2.5	2.0	49	20	3	2	2.53	2.23
20.	4.0	4.5	5.0	5.0	4.0	5.0	154	113	11	14	9.94	8.07
21.	2.5	2.0	4.5	3.0	3.0	3.0	110	66	8	8	10.90	8.25

Appendix

Individual Raw Data Collected or C_5 Group During 3 Years as Controls in Public Schools starting at Age 5 (Kindergarten Level) Fall 1968 to Age 8 (Post Second Grade) Spring 1971

Subject No.	PICTURE STORY LANGUAGE TEST					
	Productivity			Abstract-Concrete		Syntax
	Total Words	Total Sentences	Words Per Sentences	Level Attained	Raw Score	Syntax Quotients
1.	2	1	2.00	1	0	0
2.	23	1	23.00	1	0	94.29
3.	5	1	5.00	1	0	70.54
4.	0	0	0	0	0	0
5.	4	1	4.00	1	0	0
6.	0	0	0	1	0	0
7.	10	3	3.33	1	0	88.26
8.	8	2	4.00	2	3	92.27
9.	-	-	-	-	-	-
10.	1	1	1.00	1	0	0
11.	28	6	4.67	2	3	0
12.	17	3	5.67	3	8	91.05
13.	19	4	4.75	3	8	68.77
14.	30	5	6.00	3	7	80.42
15.	3	1	3.00	1	1	69.28
16.	46	9	5.11	3	7	99.28
17.	14	1	14.00	3	7	93.33
18.	6	1	6.00	2	3	73.77
19.	6	1	6.00	1	0	0
20.	2	1	2.00	1	0	0
21.	25	8	3.13	2	1	64.51

Appendix

The Illinois Test of Psycholinguistic Abilities

The Illinois Test of Psycholinguistic Abilities, authored by Samuel A. Kirk and James J. McCarthy, is a diagnostic measure for uncovering specific linguistic abilities and disabilities in children aged two to nine years. There are nine subtests in the ITPA, each designed to test a specific aspect of psycholinguistic ability. The tests are based on Charles E. Osgood's theoretical model of the dynamics of psycholinguistic functioning. Four of the nine subtests were used in collecting our data: the Visual Decoding test, the Auditory-Vocal Association test, the Visual-Motor Association test, and the Vocal Encoding test.

The Visual Decoding subtest measures the child's ability to comprehend pictures and written words. It is assessed by a technique in which the subject selects from among a set of pictures the one which is most similar in concept to a previously shown stimulus picture.

The Auditory-Vocal Association test assesses the ability to relate spoken words in a meaningful way. Subjects complete a test statement by supplying an analogous word. The examiner might say "Soup is hot; ice cream is ____".

The Visual-Motor Association subtest assesses the ability to relate meaningful visual symbols. The child selects from among a set of pictures the one which most meaningfully relates to a given stimulus picture.

Vocal Encoding is the ability to express one's ideas in spoken words. The Vocal Encoding subtest measures this ability by having the examiner ask the subject to describe simple objects such as a block or ball.

Language age norms have been provided for the ITPA in order that results can be compared with other psychological and physiological measures of children which are expressed in terms of age scores. Standard score norms are also provided.

Appendix

The Bender Gestalt Test

The Bender Gestalt Test, developed by Laurett Bender in 1938, consists of nine figures originally used by Wertheimer to demonstrate the principles of Gestalt Psychology as related to perception. Bender's adaptation of the test uses the figures as a visual motor test. The cards are presented one at a time to a subject who is told to copy them on a blank piece of paper. For this project the Bender protocols of all subjects were evaluated using the Developmental Bender Scoring System (Koppitz, 1963) which consists of 30 mutually exclusive scoring items recorded as either present or absent. Scoring categories include distortion of shape, rotation, substitution of circles for dots, perseveration, failure to integrate the parts of a figure, substitution of angles for curves, and extra or missing angles. Since the Bender Test is scored for errors a high score reflects a poor performance while a low score reflects a good performance. Normative data are available for children from ages 5 years to 11 years.

Appendix

Primary Mental Abilities Test

The theoretical basis for the Primary Mental Abilities Tests is L. G. Thurstone's group factor theory of intelligence. He maintained that certain mental activities have in common a primary factor that distinguishes them from other groups of mental activities and that each of these other groups has a different primary factor which is for the most part independent. However, high intercorrelations among subtests lead to the current position that there is additionally a second order general factor involved.

The PMA tests for the first grade were administered in small groups of four using individual booklets. All the material is presented pictorially and no reading is required.

The four primary mental abilities measures are:

Verbal meaning; defined in the examiner's manual as "the ability to understand ideas expressed in words." (Thurstone, 1963) The task ranges in complexity from choosing and marking the picture of a simple noun to choosing and marking the picture that represents the end result of a given sequence of events.

Perceptual speed; defined as "the ability to recognize likenesses and differences between objects or symbols quickly and accurately." (Thurstone, 1963) The children are required to find and mark matching pictures from series of four choices each. This is the only part of the tests that is timed in the first grade battery.

Number facility; defined as "the ability to work with numbers, to handle simple quantitative prblems accurately and to understand and recognize quantitative differences." (Thurstone, 1963) This part includes such tasks as marking a specific number of items, marking items by position, and

marking items to indicate the correct solution to word problems requiring addition and subtraction.

Spatial relations; defined as "the ability to visualize objects and figures rotated in space and the relations between them." (Thurstone, 1963) This section has two parts. The first is to find and mark the missing part of a number of squares. The second is to complete partially drawn designs in accord with a completed model.

Raw scores are converted to mental age scores and a profile can be drawn to indicate for an individual child areas of strength and weakness. The total raw score can also be assigned a mental age and together with the child's chronological age yield a quotient score providing an estimate of intelligence similar to scores on other intelligence measures.

Reference

Thurstone, L. G., Examiners Manual Primary Mental Abilities for Grades K-1, Revised 1963. Science Research Associates, Chicago, Illinois.

Appendix

The Metropolitan Readiness Tests

The Metropolitan Readiness Tests by Gertrude H. Hildreth, Ph.D., Nellie L. Griffiths, M.A., and Mary E. McGauvran, Ed.D. is a series of six subtests designed to measure the overall level of a child's "readiness" for beginning schoolwork. "Readiness"is defined as the attainment of a sufficient degree of maturity, proficiency and skill in a variety of developmental abilities important in mastering first grade work. These characteristics include linguistic attainments and aptitudes, visual and motor perception, muscular coordination and motor skills, number knowledge and the abilities to follow directions and to pay attention in group work. The tests are administered either at the end of kindergarten or the beginning of first grade. They are group administered with children using individual booklets.

Following is a brief description of the content and rationale for each subtest:

(1) Word Meaning. This is a picture vocabulary test with words drawn from standard kindergarten and primary word lists. It is designed to measure the child's store of verbal concepts, and, since vocabulary is one of the best indices of general mental maturity, to provide a representation of this in the total readiness score.

(2) Listening. In this test the child is instructed to indicate which picture best portrays an event or situation described by the examiner. This test requires the child to attend to what the examiner says, keeping in mind one or more ideas, and sometimes to make inferences beyond a literal understanding of what is said. It is designed to measure the child's ability to comprehend phrases and sentences.

(3) Matching. This is a test of visual perception and recognition of similarities. On 14 items the child is instructed to choose one picture of three that matches a given picture. The visual perceptual skills involved are similar to those needed for discriminating word forms.

(4) Alphabet. This test measures the child's ability to recognize letters of the alphabet as spoken by the examiner. The test is included because even though specific teaching of letter name is often not included in classroom instruction, most beginning first graders exhibit the ability to recognize letters. This has been demonstrated to be one of the best predictors of success in the early stages of reading.

(5) Numbers. In this test the child demonstrates his knowledge of numbers, his ability to solve simple arithmetical problems, his knowledge of quantitative relationships and related knowledge such as monetary values and relationships. This test has been shown to be the most powerful single predictor of success in first grade work and is assumed to be an indicator of a child's general level of mental alertness as well as his sensitivity to the numerical and geometric aspects of his environment.

(6) Copying. In this test the child is instructed to copy a number of items including letters of the alphabet, numbers and geometric designs. The abilities demonstrated in this task are visual perception and motor control, both necessary abilities for the learning of handwriting.

It is recommended that the total raw score of all tests be used to determine an individual child's readiness for first grade work according to the normative tables presented in he manual.

Appendix

Stanford Achievement Test

The Stanford Achievement Test is a battery of achievement tests designed to measure the knowledges, skills, and understandings commonly accepted as the desirable outcomes of the major branches of the elementary school curriculum. The Primary I Battery, consisting of six subtests, is primarily designed for use from the middle of Grade 1 to the middle of Grade 2. The six subtests are described below:

(1) The Word Reading Test consisting of 35 items, measures the ability to analyze a word without the aid of context. In this subtest the pupils are required to look at a picture and then select the word which stands for the picture from a group of four words.

(2) The Paragraph Meaning Test consists of a series of paragraphs, graduated in difficulty, from each of which one or more words have been omitted. The pupil is to demonstrate his comprehension of the paragraph by selecting the proper word for each omission from four choices that are afforded him. The test thus provides a functional measure of the child's ability to comprehend connected discourse ranging in length from single sentences to parapraphs of six sentences and involving levels of comprehension varying from extremely simple recognition to the making of inferences from several related sentences.

(3) The Vocabulary Test measures a pupil's vocabulary independent of his reading skill. The test includes items measuring knowledge of synonyms, of simple definitions, of ready associations, and items designed to measure higher - level comprehension of the concepts represented by words, and fullness of understanding of terms. The pupil is required to select from a series of three alternatives the proper answer to a question

or a statement read by the examiner.

(4) The Spelling Test employs a dictation-type exercise. The word to be spelled is pronounced by the examiner, an illustrative sentence is read, and the word is repeated, whereupon the pupil writes the word in his test booklet.

(5) The Word Study Skills Test consists of 56 multiple-choice items in four categories, as follows:

1. Auditory perception of beginning sounds. In this part a pupil hears one word read by the examiner. He then reads with the examiner three other words from which he must select one whose beginning sound is the same as the word first read by the examiner.

2. Auditory perception of ending sounds. In this part, the word to be chosen has the same ending sound as a word which the pupil hears.

3. Phonics. In this part, the pupil must match a word he hears with one of three which he reads. The examiner reads a sentence, and the pupil selects the written word which is the same as the last word in the sentence.

4. Phonograms, or rhythming words. In this part a pupil must match a word he hears with a rhythming word which he reads.

(6) The Arithmetic Test contains 63 items in three parts: Measures, Problem Solving, and Number Concepts.

The Measures part evaluates the pupil's understanding of the meaning of measurement and basic knowledge of standard units.

The Problem Solving part evaluates the pupil's ability to do simple computations and to understand the language of problems.

Appendix

The Numbers Concepts part of the test includes, among other things, counting by twos, knowledge of easy addition and subtraction facts, meaning of a unit fraction, and ability to pair an array of objects with its number name.

Scoring Criteria for Mathematics Measure

1. Total number of problems attempted; broken down by problems in addition with 2, 3, or 4 elements and problems in subtraction.
2. The ability to make a mathematical statement.
3. The accuracy of the problem.
4. Utilizing the pattern in the second and fourth groups of numbers.
5. Using one of the numbers given as an answer.
6. Handwriting reversals.

Instructions for Test of Math Ability

Let's see how many problems and answers you can make with these numbers. You can make any kind of problems you want to. Use the numbers in as many ways as you can. For example, if we had the numbers 1 and 2 here are two ways you can make problems:

1 + 1 = 2

2 - 1 = 1

Now see what else you can do with the numbers 1 and 2.

Number series used in test - Post first grade

4, 1

5,2,3

1,3,8

2,7,4,1

Post Second grade

5,2,3
2,7,4,1
3,4,12
143,132

Appendix

CREATIVITY RATING CRITERIA

Creativity

1. No creative content; object naming, unelaborated description

2. Minimum creativity shown; 1 or 2 objects, actions, details added to the picture content

3. Some creativity shown; rudiments of a story - one sentence narrative, projection of what happened, or is going to happen (1 step in sequence only) (He is going to open it).

4. Definite creativity shown; meaning added to the picture content to make it a sequence of events showing some imagination and going beyond the stimulus content (two or more sequential steps to narrative)

5. A creative story; a fairly meaningful, coherent, story that has some degree of unusualness

6. A very creative story; a meaningful, coherent, imaginative story

Abstraction

1. Object naming

2. Simple description of picture beyond object naming (e.g. "a boy swimming)"

3. Mostly description but some inter-relating between characters and/or objects in the picture (The boy is swimming to the box).

4. A narrative that integrates aspects within the picture and includes emotions and actions attributed to the characters (He got friendly with the whale). (He caught the fish).

5. A narrative that projects emotions and actions beyond the stimulus presented in the picture. (The baby turtle went and told his mama).

6. A narrative that interprets different aspects of the picture, is relevant to it, but goes well beyond the picture in content.

Language Quality

1. Very sparse quality; generalized, simple vocabulary. No descriptive terminology (Listing objects by most general terms)

2. Use of at least one descriptive adjective and one action word (verb); still very generalized (little fishes, two boys, some shells, swimming, going), mostly listing - not complete sentences.

3. Use of more explicit nouns (whale, ocean, jellyfish), not really vivid, basic action verbs (saw, fell, looked), generalized adjectives (one, some, another), mostly complete sentences. Descriptions.

4. Use of descriptive phrasing (turned upside down, went down through the water) explicit verbs (dive)

5. Vivid description, explicit nouns and adjectives that conjure up a specific picture (treasure chest, shark, dolphin), personalization of characters (Moby Dick, more than naming, use of dialogue between characters)

6. Excellent command of vivid vocabulary and grammar in describing objects and actions.

TEACHER RATING SCALE

Directions: For items A through E, circle the number of the statement that best describes the child.

Child's name_____

School_____

Teacher_____

The child's behavior:

A. Ratings on effort:

1. The child almost never tries his best or puts his best effort to his activities.

2. The child puts some effort into his work but could try harder most of the time.

3. The child shows a lot of effort but on many occasions does not try as hard as he could.

4. He is a very hard worker and usually puts his best effort into an activity.

B. Ratings on persistence:

1. The child shows little persistence and stops very quickly when any activity presents a challenge.

2. The child shows some persistence but gives up after only a short attempt at solving a problem or working at an activity which is challenging.

3. The child is quite persistent and will stick to a task or challenge for some time but gives up more quickly than some children.

4. The child shows a great deal of persistence and when confronted with a challenge or a problem which he cannot easily solve will stick with trying for much longer than average.

C. Ratings on goal directedness:

1. The child rarely gives evidence of working toward a given goal or evaluating his activities and work.

2. There appears to be some direction in the child's activity with some goal in mind, but little interest or checking to see if the goal is being reached or worked toward.

3. The child, when working appears to have a goal definitely in mind, shows some indication of making observations about his activity and whether or not this is leading to the goal toward which he is working.

4. The child is very observant of what he does; he is usually conscientious of the goal toward which he is working and appears to evaluate, look at, and check out whether or not he is moving toward a given goal in the activity.

D. Independence of work:

1. The child rarely works things out on his own and quickly seeks the help of other people.

2. The child will work on his own but only on tasks that are not difficult and challenging. On these tasks he rather quickly seeks the help of someone else.

3. The child generally likes to try things on his own and work them out on his own but if they become somewhat difficult will seek out help or assistance from the teacher or another child.

4. The child shows a great deal of independence in his work, likes to try things on his own and tries to work out problems and activities without the help of others even when they become difficult.

E. Ratings on fear of failure:

1. The child becomes quite upset and shows little confidence in himself when confronted with failure or when he is unable to complete or satisfactorily work out a task.

2. The child shows a mild lack of confidence and becomes somewhat upset when confronted with failure or when he is unable to complete a task or do well.

3. The child is quite confident of his own abilities and only shows minor concerns of feelings of inadequacy when he fails to complete a task or feels he has not done well.

4. The child appears to be very confident of his abilities and is not upset when he fails at a task or is unable to complete the task.

Appendix

Diagnostic Reading Scales

The Diagnostic Reading Scales,developed by George D. Spache, are a series of individually administered tests developed to provide standardized evaluations of oral and silent reading skills and of auditory comprehension. The battery consists of three Word Recognition Lists, twenty-two Reading Passages of graduated difficulty, and six supplementary Phonics Tests.

The Word Lists test the reader's skill at word recognition and analysis and also determine the level at which testing should begin in the Reading Passage.

The Reading Passages, of the same type and range of reading material used in classrooms for reading assignments from mid-first grade to eighth grade, include narrative, expository, and descriptive selections. The Reading Passages are used to obtain grade level scores for each pupil as follows:

1. The Instructional Level (Oral Reading) - an indication of the child's grade level in oral reading thus implying the grade level of basal reading materials to which the child should or would be exposed in a typical classroom.

2. The Independent Level (Silent Reading) - the grade level of supplementary instructional and recreational reading materials which the child can read to himself with an adequate degree of comprehension, even though he may have some word recognition difficulties.

3. The Potential Level (Auditory Comprehension) - an indication of the level to which a child's reading can grow when existing difficulties with mechanics or vocabulary are overcome.

The Phonics Tests measure the following specific phonic skills; consonant sounds, vowel sounds, consonant blends, common syllables, blends, and letter sounds.

For this research project grade level scores were obtained on the Word Recognition lists, plus the Instructional and Potential Levels on the Reading passages.

Auditory Discrimination Test

The Auditory Discrimination Test developed by Joseph M. Wepman is a measure to determine a child's ability to recognize the fine differences that exist between the phonemes used in English speech, an ability which has been found to be somewhat related to reading ability. This measure can be useful as a screening device to identify 5 or 6 year old children who are likely to experience difficulty learning the phonics necessary for reading.

The child is asked to listen to the examiner read pairs of words and to indicate whether the words are the same or different. The test is composed of 40 word pairs which include comparisons between initial consonants, final consonants, medial vowels, and 10 false choices (a single word repeated).

Picture Story Language Test

The Picture Story Language Test by Helmer R. Myklebust is a standardized measure designed to study written language developmentally and diagnostically. The test consists of the presentation of a standard picture about which subjects are asked to write a story. Their responses are then evaluated on each of three scales in order to obtain a profile of abilities with respect to their facility with written language. The scales are Productivity, Syntax and Abstract-Concrete and each is considered equally essential to effective communication.

The Productivity Scale consists of three measures; all considered necessary at some minimum level for useful communication to occur. These measures are Total Words, Total Sentences and Words per Sentence.

The Syntax Scale is a measure of correctness in language usage and is scored as Error Categories and Error Types. The Error Categories are Word Usage, Word Endings and Punctuation and the Error Types are Additions, Omissions, Substitutions and Word Order. Final scores are reported as Syntax Quotients which are composite scores of errors and correctness.

The Abstract-Concrete Scale is a measure of effectiveness with which ideas are conveyed and consists of a series of definitions which serve as criteria for rating the level of abstract thought on a scale from 1 to 5. The Abstract-Concrete Scale is seen as a continuum with ideas bound to what is observable in the picture being concrete and ideas detached from the observable as abstract.

Normative data for normal children are available from ages 7-17 and for males and females.

The Children's Form of the Rosenzweig Picture-Frustration Study

The Children's Form of the Rosenzweig Picture Frustration Study by Saul Rosenzweig, Edith E. Fleming and Louise Rosenzweig is a limited projective device designed to evaluate modes of responses to stressful situations. Children are presented with 24 cartoon-like drawings of different everyday stress producing situations and are allowed to identify with and respond for anonymous figures in the drawings. Although first designed for use with adults this device was well adapted for use with children because of its game-like quality.

Children's responses to the frustrating situations are assumed to reflect their identification with the frustrated individual pictured and to project their own bias in their replies. This bias is scored by dividing the responses into various categories under the headings of direction of aggression and type of reaction.

Direction of aggression consists of three categories. The first of these is extrapunitiveness (E) which is aggression directed at the environment. Intropunitiveness (I) is aggression turned by the subject onto himself. Impunitiveness (M) is aggression which is evaded in an attempt to gloss it over.

Type of reaction also consists of three categories. Obstacle dominance (O-D) is a type of reaction which involves responses which emphasize the barrier causing the frustration. Ego defense (E-D) describes responses in which the ego of the subject predominates and need persistence (N-P) describes responses in which the solution to the frustrating problem is emphasized.

By combining these six categories a total of nine possible scoring factors are obtained. A subject's score is then determined by the total number of responses that occur on each of the nine factors as he responds to all the drawings. These scores can then be figured as percentages and compared to available age norms.

A final measure obtained from the scores on this test is called the Group Conformity Rating (GCR) which reflects the modal response to each item given by a normal sample of the population. The individual's responses can be compared to these norms.

The norms available for children range from four to thirteen years of age with age levels of two years.